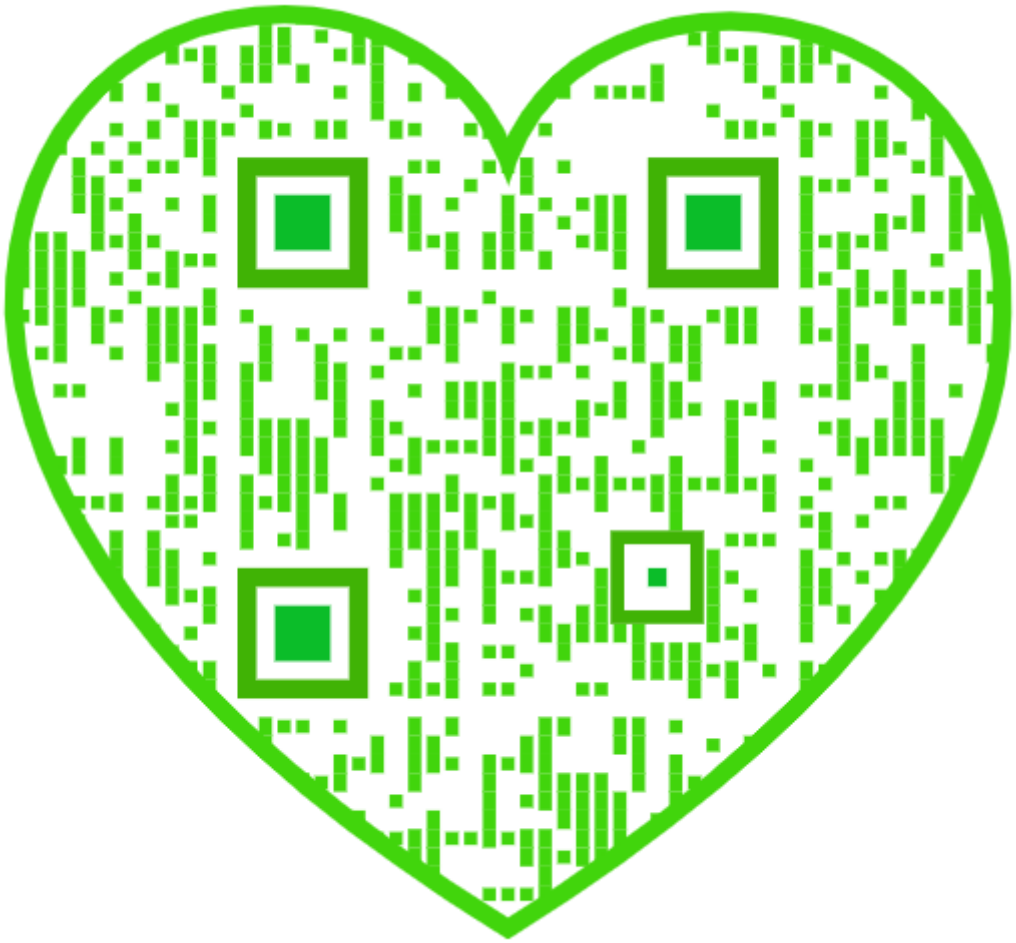

BANDAGING

BY

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To

John B. Deaver, M. D., Sc. D., LL. D.,

as a slight tribute to his influence as a friend, a teacher,
and a surgeon
this volume is affectionately dedicated

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PREFACE

THE present volume is practically a repetition of the author's instruction in bandaging at the University of Pennsylvania. It is intended for beginners and, therefore, an attempt has been made to follow the course of each bandage in detail, so that the student, when studying the turns in the absence of a teacher, may not make false ones which must be corrected later.

To overcome some of the deterioration in the Art of Bandaging resulting from the too prevalent use of the gauze roller, it is strongly recommended that muslin be used by all beginners. They may thus learn how a perfect bandage should be applied, and will soon discover that a similar bandage, except in a few instances, cannot be applied with gauze.

The illustrations of bandages used to amplify the instructions in the text are reproductions of photographs. It was thought that the student could obtain a better idea of the appearance of the completed bandage from such illustrations than from any drawn diagramatically. The rollers used in applying the bandages for the photographer were blackened on the edges with waterproof ink, so that "spaces," "crosses," and "spicas" could be made more prominent. Similar rollers are used by the author in teaching and are recommended to the students when they are practising bandaging, so that their faults may be made more prominent and may be overcome early in their career.

The author wishes to express his gratitude to Dr. Alexander Randall for many valuable suggestions in regard to the manuscript.

A. D. WHITING.

1523 SPRUCE STREET,
PHILADELPHIA, PA.,
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BANDAGING

BANDAGING is not an exact science. It is an art which can be acquired only through a correct conception of the object to be accomplished by a bandage, study of the principles underlying its application, and persistent practice in applying it.

Accomplishment of purpose, rather than creation of a thing of beauty, should underlie every attempt to apply a bandage. A "pretty" bandage may not be properly applied, it is not necessarily free from defects, it may do considerable harm; one properly applied fulfils the object of the bandage, does no harm, and is usually pleasing to the eye.

Bandages are used to hold dressings or splints in place; to exert pressure; to deplete a part of its blood supply; to restrict or limit motion; to support a part of the body. They are divided into three large classes—the roller, the tailed, and the handkerchief—so named because of their physical characteristics rather than the uses to which they are put. The roller bandage affords the widest range of usefulness, as it is applicable to any of the objects of a bandage; the tailed bandage, although limited in its usefulness, is unsurpassed in certain selected instances; the handkerchief bandage is very useful in emergencies and, with few exceptions, should be used only in that capacity.

PART I

THE ROLLER BANDAGE

A strip of any bandage material wound upon itself into a compact roll is known as a roller bandage (Fig. 1).

When the strip is wound upon itself from both ends toward the center, thus forming two cylinders, a double roller is formed (Fig. 2).

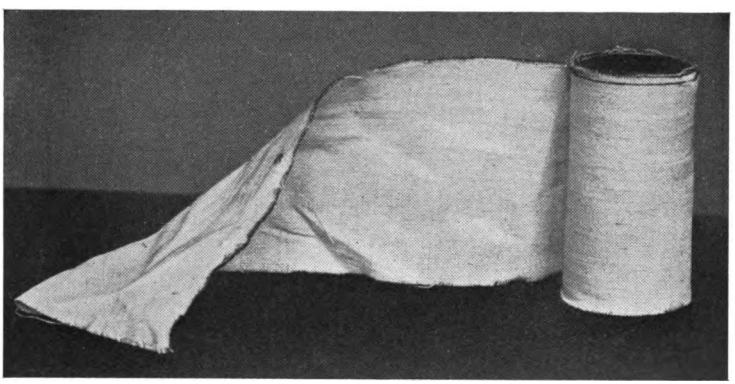

Fig. 1.—Single roller.

Practically any material capable of being wound upon itself into a compact roll may be used in making a roller bandage. The materials generally used are muslin, gauze, flannel, flannellet, rubber, or woven elastic, that most frequently employed being *muslin*. This is strong and firm, has sufficient body to make its application uniform throughout, and is

comparatively cheap. The muslin roller should be used exclusively by the beginner in bandaging when practising the various fundamental (page 30) and special (page 40) bandages, and especially when learning to make a roller bandage by hand.

Gauze is soft and pliable and can be pulled into place readily, is lighter in weight and is cooler than muslin, can be sterilized, and lends itself readily to saturation with an antiseptic solution. It is the best material to use in bandaging

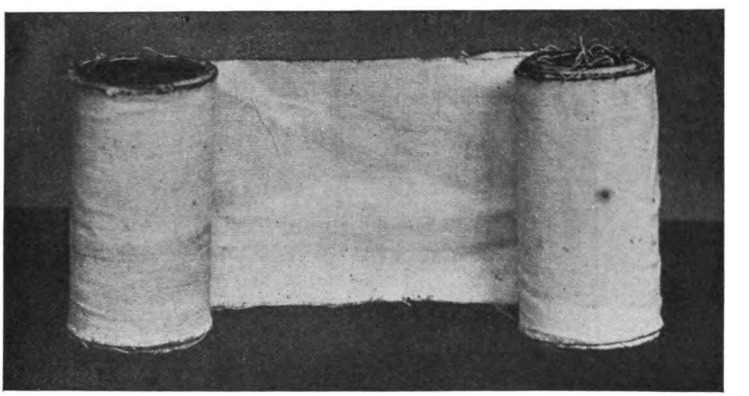

Fig. 2.—Double roller.

the eye, the ear, and the fingers, but it is too light and flimsy to be used when a firm bandage with pressure is required.

It is very difficult to make a good gauze-roller by hand. The full width of the material as woven should be made into a compact cylinder, preferably by machinery, and this cylinder should be cut into the desired widths by means of a sharp knife.

Flannel is a soft, pliable bandage material that adapts itself readily to uneven surfaces. It is of special value in eye bandages (page 66) and as a soft protective beneath a plaster-

of-Paris cast. Its cost, however, practically prohibits its general use.

Flannellet is a splendid substitute for flannel in every particular, and is very much cheaper.

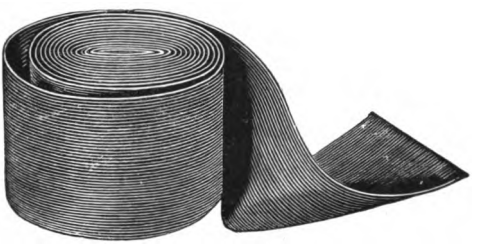

Fig. 3.—Esmarch's rubber bandage.

Rubber (Fig. 3) is used as a bandage material when it is desired to render a part bloodless, as in Esmarch's method, or where pressure is desired in the treatment of certain joint affections, leg ulcers, etc.

Fig. 4.—Smooth web elastic bandage.

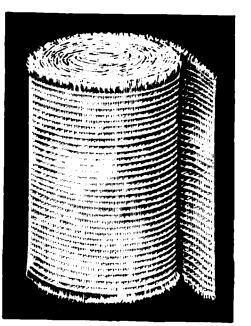

Fig. 5.—"Rubberless" elastic bandage.

Woven elastic material may be used in place of a rubber bandage in the treatment of joint affections, and especially for support in varicose conditions of the lower extremities. An

elastic woven bandage may be self-applied with better effect than would result from the self-application of muslin or gauze. The material may be interwoven with rubber (Fig. 4) or be rubberless (Fig. 5).

MAKING A ROLLER BANDAGE

A machine-made roller bandage may be purchased at almost any drug-store; those made of gauze, rubber, or woven material should not be made, as a rule, by the operator. Anyone, however, who expects to use bandages must know how to make them by hand and by the bandage machine. The beginner should practice this task with muslin rather than gauze or flannellet, and with narrow rather than wide strips. A piece of unbleached muslin, the full width of the bolt and 5 or 7 yards long, should be obtained. One end of the piece is cut with scissors into strips the width of the desired bandage, the first and last cuts being a little more than the width of the selvedge, and the strips are torn down about 1 foot. The operator and his assistant face each other, with the piece of muslin between them. Beginning with the selvedge at one side, they take hold of alternate strips and tear the piece through its entire length. The strips will be rumpled, owing to the pulling, and must be straightened out, and all ravelings must be removed from either edge of the strips.

To Roll a Bandage by Hand.—Lay the strip on the anterior surface of the thigh. Fold the first 10 or 12 inches on the succeeding portion; fold the folded portion on itself repeatedly, shortening the fold each time, until the last one is about 2 inches long. Roll the folds on themselves with the thumbs and index-fingers, using as much pressure as possible, to make the core hard. After the folds have been rolled, place the roll on the upper part of the anterior surface of the thigh, and while the strip is held taut and smooth with the left hand, run

the roller downward under the fingers and palm of the right hand, with as much pressure as possible. Repeat this procedure two or three times until the roll is large enough to be held between the thumb and index-finger and firm enough to withstand considerable pressure from end to end without bending.

Hold the roll between the thumb and index- or second finger of the left hand, with the unwound portion of the strip leaving

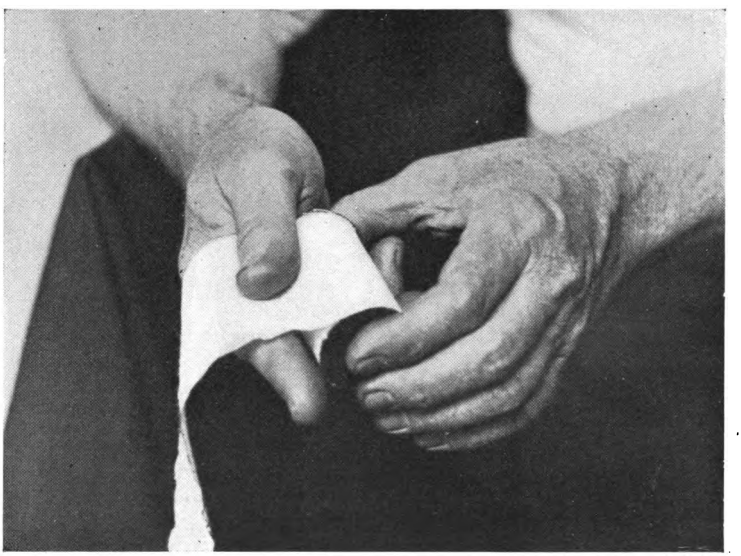

Fig. 6.—Rolling a bandage by hand.

the upper surface. Grasp the body of the roll between the thumb and flexed second finger of the right hand, with the unwound portion of the strip running over the extended index-finger and in such a position that pressure may be made upon it by the thumb and finger (Fig. 6). Hold the roll firmly between the thumb and finger of the left hand and supinate the right hand, allowing it to slide around the roll. Decrease

the pressure made on the axis of the roll by the left thumb and finger and pronate the right hand, exerting sufficient pressure on the body of the roll to make it turn on its long axis. Repeat these movements until the entire strip has been made into a compact cylinder, taking care to remove all ravelings as the roll is made. After the knack of rolling a bandage has been learned, the operation can be made more rapid by pronating and supinating both hands simultaneously, the left hand revolving the cylinder while being supinated, the right while being pronated.

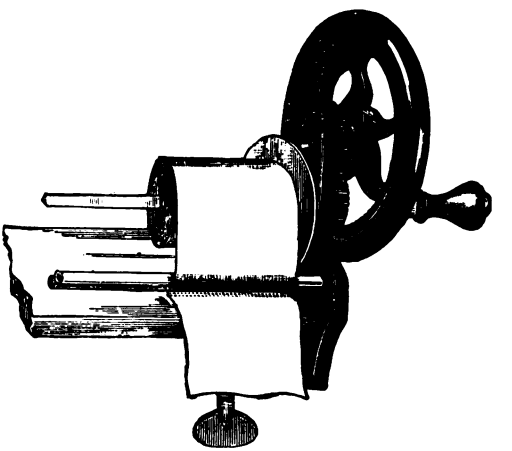

Fig. 7.—A bandage roller.

A loosely rolled bandage will not unroll smoothly under such tension as is necessary to make it lie snug against the part. As a roller made by hand is with difficulty made compact enough to overcome this defect, it should be made by machine, although it is essential that everyone using roller bandages should be able to roll them fairly well by hand.

Machine Rolling.—The machine used for rolling bandages, called a "bandage roller," consists of a winch with a series of

parallel bars through which the strip of bandage material is passed before being wound on the rod, or shaft, of the winch (Fig. 7). Usually three parallel bars are sufficient to fulfil their purpose—viz., to prevent infolding of the edges by making the bandage material lie perfectly flat as it is wound on the shaft of the winch. This shaft is square or hexagonal in

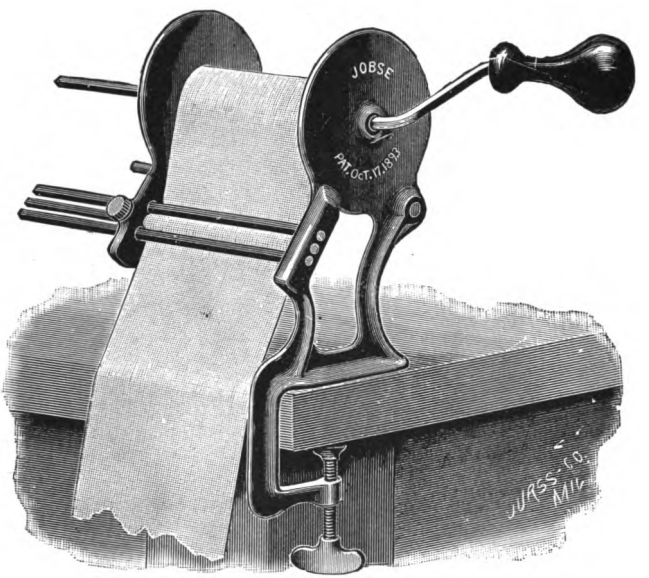

Fig. 8.—Bandage roller with adjustable guide.

shape and tapers slightly from the crank end. On many machines there is an adjustable guide which slides on the shaft and parallel bars. The machine is clamped to a table (Fig. 8).

When using the bandage roller, pass the end of the strip of material from behind forward between the lower two parallel bars, and from before backward between the upper two,

close to the crank side of the winch. Hold the crank handle as close to the side of the upright as possible, turn the end of the strip over the shaft, close to the right upright, and hold it in place with the left hand, and with the right turn the crank in the direction taken by the hands of a clock, so that the strip will be fed to the upper surface of the shaft. As soon as the shaft grips the material, transfer the left hand to the strip below the parallel bars. If there is a guide on the machine, move it forward until it touches the edge of the strip. Turn the crank with the right hand and make sufficient traction

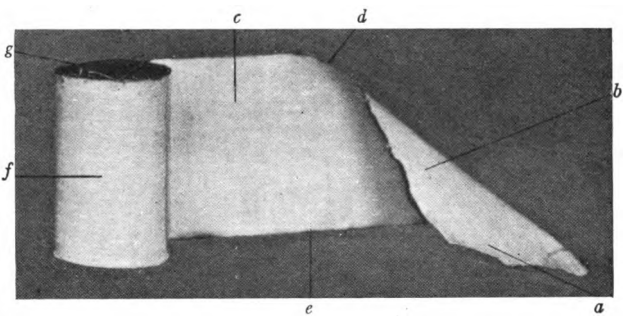

Fig. 9.—Roller bandage: *a*, Initial extremity; *b*, outer surface; *c*, inner surface; *d*, upper edge or border; *e*, lower edge or border; *f*, body; *g*, terminal extremity.

with the left to insure a tight roller. After the entire strip has been wound, hold the roller firmly with the left hand and make three or four turns with the crank to tighten the roll. Make two or three reverse turns with the crank while the roll is held fast, and withdraw the shaft from the bandage. Turn in the corners of the end of the strip and fasten the end with a pin or piece of adhesive plaster.

A roller bandage (Fig. 9) consists of a body, an initial extremity, the part first unwound from the body, and a terminal extremity or end. The strip composing the body has an inner

and an outer surface, the former lying in contact with the body, and an upper and a lower edge or border.

Width and Length of the Roller Bandage.—Roller bandages vary in width from ½ inch to 6 inches. Narrow bandages, not more than 1 inch wide, should be used when bandaging the fingers; the very wide ones may be used when bandaging the trunk. The most commonly used rollers range in width from 1 inch to 3 inches, with gradations of ½ inch, and in length from 5 to 7 yards. No definite length can be assumed for any bandage, as it is impossible to calculate the various turns that may be required to properly fulfil the objects of the bandage. A sufficient number of turns must be made in every instance to properly bandage the part, whether such turns require 3 or 10 yards.

PLASTER BANDAGES

Plaster-of-Paris bandages have superseded, in general use, all other forms of hardening bandages when a fixed dressing is required. Silicate of soda, starch, and paraffin are similarly used occasionally. They form a lighter dressing than the plaster, but are more difficult to apply, are more expensive, and are not more efficient.

Plaster-of-Paris rollers may be bought in any drug-store, hermetically sealed in a tin box. As a rule they are too tightly rolled and not readily saturated with water, as they must be before being applied, and, therefore, are not so efficient as those made by the operator or his assistants. The requisite materials are a strip of some meshed goods, such as cheese-cloth, mosquito-netting, or crinoline (crinoline being far superior to the others), and a highly calcined or anhydrous gypsum, generally known as plaster of Paris. This is an impure, earthy alabaster which has been deprived of its water of crystallization by heating. If exposed to the air,

especially in the presence of moisture, it readily takes up some of this water of crystallization and becomes lumpy, and in that condition is of no value to the surgeon. The plaster must be kept dry, and must be smooth and free from all granular particles when used.

To make a plaster-of-Paris roller, take a strip of crinoline 3 or 5 yards long and 3 or 4 inches wide, lay it lengthwise on any flat surface, but preferably on a large, flat pan, and fill the meshes with the plaster, using either a flexible spatula or the fingers to rub it in. As the crinoline becomes thoroughly impregnated, roll it loosely into a cylinder. If the roller is not to be used immediately, it should be wrapped in tissue-paper and placed in an air-tight vessel. When exposed to the air the plaster is changed into a granular, sandy material through its absorption of moisture, and in that condition will not make a compact solid when applied as a cast. Baking in a hot oven for a half-hour will greatly improve the quality of old or exposed plaster rollers.

Plaster-of-Paris bandages may be made by drawing the strip of crinoline, under a roller, through a mass of gypsum in any deep vessel, the strip being loosely wound as it emerges from the plaster. Such rollers are not so satisfactory as those made by rubbing the plaster into the meshes, as the plaster is not so evenly distributed.

When a plaster roller is to be applied it must be immersed in water, lying on its side rather than its end, as the latter position will allow more of the plaster to drop from the meshes. When bubbles of air cease to rise from the roller, it should be picked up by both ends and the surplus water should be removed by compressing the cylinder from end to end or by a twisting motion. Less plaster will be displaced by this method than by compressing the roller and forcing the water out of the ends. If the roller is allowed to remain too long

in the water the plaster will "set" in fine particles like sand; such a bandage is of no further value. The ultimate "setting" of the plaster is not due to a chemical change in the gypsum, but is simply a change from its calcined to its hydrous or crystalline form.

The part to which the plaster is to be applied should be shaved, cleaned, and made dry. It should then be covered with stockinet (Fig. 10) or a flannel or flannellet bandage. Bony prominences should be protected by a layer of cotton.

The operator may wear rubber gloves or smear the hands with vaselin, which will prevent the plaster sticking to the skin.

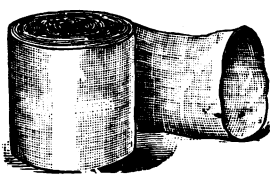

Fig. 10.—Tubular stockinet.

The plaster bandage is applied with the same turns used in the application of the ordinary roller, with the exception of the "reverse." The turns should not be made taut, because the strength of the resulting "cast" does not depend upon the tight bandage, but upon the plaster reinforced by the crinoline. The short *figure-of-8*, the *rapid ascending spiral*, and *rapid descending spiral* turns are most frequently used. If there should be gapping of any of the turns, a "dart" should be folded in the gapping portion.

If it is advisable to open the cast immediately after its application, a strip of zinc about 1 inch wide and long enough to extend beyond either end of the cast should be laid, lengthwise of the part to be covered, on the protecting stockinet or bandage. The cast may be incised without endangering

the underlying skin by cutting on this strip, which should later be removed by traction on one end.

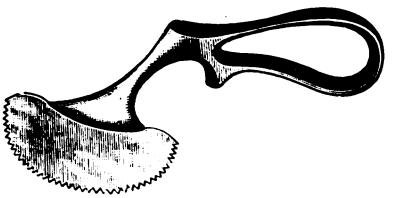

Fig. 11.—Engel's plaster-saw.

If the cast is not opened at the time of application, it may be removed when desired by means of the plaster-saw (Fig. 11), the plaster-knife (Fig. 12), and the plaster-shears (Fig.

Fig. 12.—Merrill's plaster-knife.

13). The easiest way to cut through the plaster is to make a groove with the saw or knife and apply peroxid of hydrogen, vinegar, or dilute hydrochloric acid along the groove. This

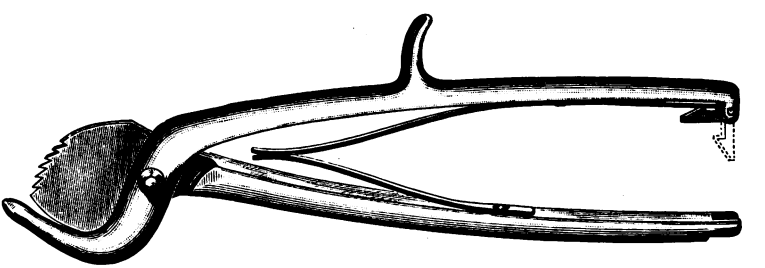

Fig. 13.—Reed's plaster-shears.

application will soften the plaster so that it may be cut easily with the knife or saw. Repeated applications of the acid or

peroxid will make the cutting easier. The last few layers, with the underlying protective, should be cut with the blunt-pointed scissors and the protective should be removed with the cast, to the inner surface of which it will adhere.

APPLICATION OF THE ROLLER BANDAGE

Underlying Principles.—A perfect bandage is one that accomplishes its object by a combination of turns so arranged that no unnecessary material is used; by turns so placed that none are required to cover underlying defects; by turns so applied that the pressure throughout is even and sufficient, but not more than enough to fulfil the requirements of the bandage. Perfection should be sought in every instance; careless, slovenly bandaging should never be permitted by anyone, although such is frequently seen.

More perfect bandages would be applied if the operator would realize that the bandage should be allowed to follow its natural course as far as possible, this natural course being determined by the fact that it lies flat on the underlying surface, with both edges in contact with the surface and under an even tension. If this natural course should not agree with the one desired by the operator, it should not be changed or altered by tugging and pulling, as this would cause more pressure to be exerted by one edge than the other, but a "reverse" (page 35) should be made and the bandage thus started on a new course.

A bandage should not "gap." A *gap* is made when the bandage is so applied that while one edge is lying firmly against the part, the other edge is loose. As a result, the pressure exerted on the underlying structures is uneven. "Gapping" should be overcome in every instance by allowing the bandage to follow its natural course; if this does not agree with the one desired, a reverse should be made, as stated above, and

the turn started in the direction required. Covering the gaps by subsequent turns, as is so frequently done, will hide these poorly made ones and possibly make the finished bandage more presentable, but it will not remove the defects of the covered turns. When a turn that gaps is covered by one superimposed, the loose portion of the former will be wrinkled or folded upon itself and will thereby cause markedly uneven, irregular pressure to be exerted upon the underlying tissues.

Bandages should be applied, as far as possible, in the direction of the venous circulation, so that any pressure that may be exerted by the various turns will have a tendency to empty the superficial veins rather than cause their engorgement. A *rapid descending spiral* bandage may be applied to a part without interference with the circulation, because the subsequent turns of the completed bandage will be made from the distal to the proximal end of the part, thus exerting pressure in the line of the venous circulation.

When a bandage does not cover an entire extremity, the portion distal to the bandage may become edematous. After swelling of the part begins, it progresses rapidly because of the increased tension of the lower border of the distal turn. For this reason, all bandages of the leg or forearm should include turns around the foot and hand respectively. An edematous condition of the tissues will occur, likewise, if a portion of the part being bandaged is exposed.

Most bandages are made secure by their proper application; therefore security should not be obtained by reduplication of turns run in various directions. When proper application does not afford the desired security, strips of adhesive plaster should be laid across the various turns. They may be pinned or tacked with a needle and thread, but both methods are inferior to the use of adhesive plaster. Ordinary pins should seldom be used, because they are easily displaced

and because they may prick the patient. Safety-pins do not present the same objections.

A *turn* is made by carrying the bandage around or over a part. These *rounds* or *turns* are designated, according to their general characteristics, as the *circular*, the *rapid ascending spiral*, the *rapid descending spiral*, the *slow ascending spiral*, the *slow descending spiral*, the *reverse*, the *recurrent*, and the *figure-of-8 turn*. For convenience of study and practice they are grouped to form what are known as the "fundamental bandages" (p. 30). As they are the foundation of all special bandages, a thorough knowledge of their application is essential to the mastery of the art of bandaging.

Spacing is accomplished by overlapping the various turns. The spaces thus made should equal, with few exceptions, about one-third of the width of the bandage, two-thirds of the underlying turn being covered by the one superimposed, the remaining one-third being exposed or uncovered. It must be remembered that each added layer of bandage increases the pressure on the underlying structures. This pressure will be practically uniform throughout if the spaces are made equal and if the various turns are applied with an even tension.

Crosses are made by *reverse* or *figure-of-8* turns, the latter usually forming a series known as a *spica*. When they are made in bandaging the extremities, they should run in a straight line, parallel with the long axis of the part, and should be placed over a fleshy portion of the limb rather than directly over a poorly covered bone, such as the "shin-bone." Crosses will run in a straight line if the spaces on either side are equal in width; if they are unequal, the line of crosses will be deflected toward the wider space.

Beginning a Bandage (Fig. 14).—Hold the roller in the right hand between the thumb and the second and ring fingers with the index- and little fingers resting on the upper and

lower borders respectively, the body of the roller being anterior or uppermost and the initial extremity coming from the posterior or lowermost portion. Grasp the initial extremity with the left hand and unwind 6 or 8 inches of the bandage by making traction with the left hand while the roll revolves in the right.

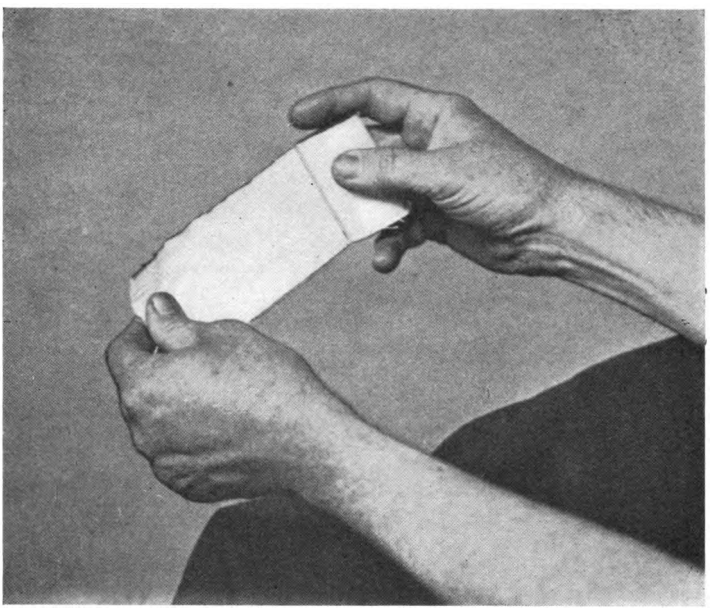

Fig. 14.—Beginning a bandage; method of holding.

To fasten the initial extremity:

Circular Method (Fig. 15).—Lay the outer surface (page 19) of the bandage on the part and hold it in place with the left hand. Carry the roller toward the right with the right hand. It will be noted that the body of the roller leaves the inner surface of the bandage and unwinds away from the part. As the roller nears the posterior portion of the part

being bandaged, hold the initial extremity with the thumb of the right hand and take the roller in the left. Carry the

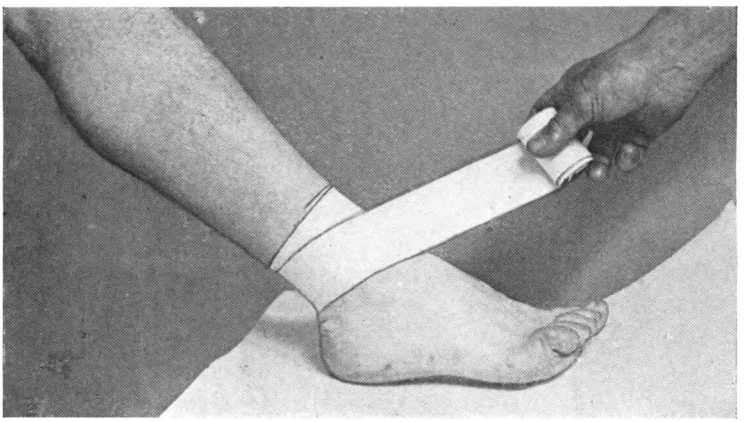

Fig. 15.—Circular method of fastening the initial extremity.

roller forward with the left hand and exactly cover the initial extremity. Repeat this turn two or three times, but do not

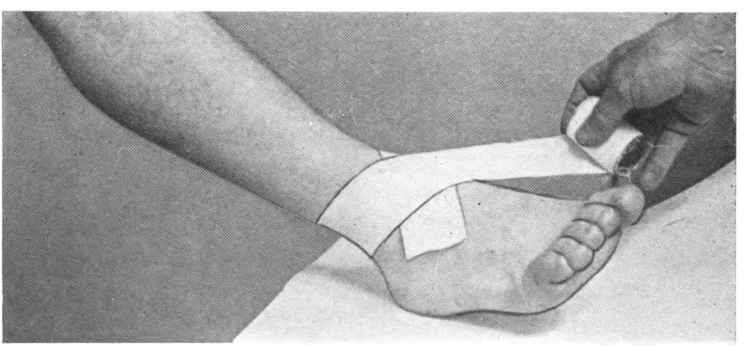

Fig. 16.—The oblique method of fastening the initial extremity.

forget that every superimposed turn increases the pressure on the underlying structures, and that these circular turns, therefore, should not be made more snug than necessary.

The Oblique Method (Fig. 16).—When the bandage is to descend before ascending on the part, as in all bandages of the forearm and leg, the oblique method of fixation of the initial extremity is preferred to the circular, because it holds the end more firmly and does not exert so much pressure.

Place the initial extremity obliquely across the part from before backward (or from below upward) and from left to right. Hold the end in place with the left hand and carry the roller toward the right and backward with the right hand. As the roller nears the posterior surface of the part being bandaged, hold the initial extremity with the thumb of the right hand and grasp the roller with the left. Carry the roller forward with the left hand and secure the initial extremity by crossing it obliquely from behind forward (or from above downward).

Ending a Bandage.—After the bandage has been completed, cut off any surplus material or make a couple of extra turns to exhaust it. Turn under the corners of the terminal extremity or end and fasten it with a piece of adhesive plaster or a pin. When neither is available, tear or split the end of the bandage for a distance equal to the circumference of the part. Make a single knot close to the unslit portion of the bandage to prevent further splitting and then tie the two ends around the part.

Removing a Bandage.—When a bandage is to be removed, unfasten the terminal extremity or end and make a loose roll which winds up toward the part. Pass the roll from hand to hand around the part in such a manner that each turn will be wound upon the roll. This method is not applicable to the removal of a finger bandage. When removing a bandage from the finger, unfasten the terminal extremity or end and carry it to the end of the finger. Make gentle traction on the bandage and follow the unwinding turn around the end of the finger.

THE FUNDAMENTAL BANDAGES

It is impossible to pay too much attention to the "fundamental bandages." Almost every special bandage is a combination of fundamental turns, and a thorough knowledge of the latter will make the study of the former much more interesting and their application much less confusing.

All of the fundamental and special bandages to be described are applicable to the naked part. Many alterations from the

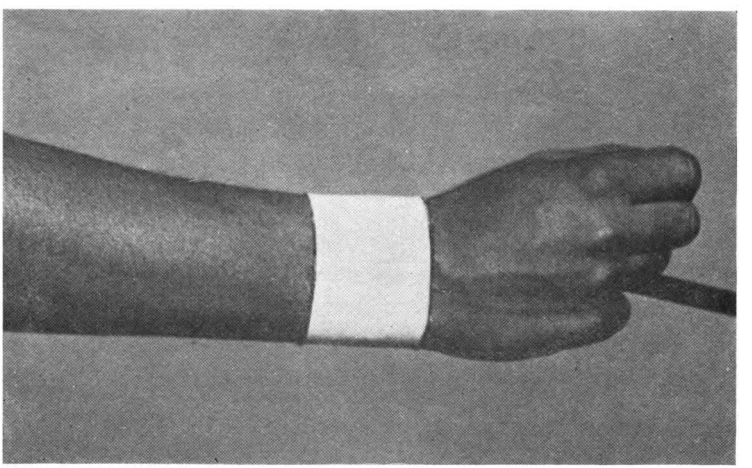

Fig. 17.—Circular bandage.

prescribed turns may have to be made when a large dressing is to be held in place or when a splint is to be applied. A different combination of the fundamental turns may be required, but a thorough knowledge of them will make their use so easy that a perfect bandage (page 24) will result in a majority of cases.

Unless otherwise designated, all bandages are described as being applied by a right-handed operator, and all turns, except the recurrent, are made clockwise, that is, in the direc-

tion the hands of a clock travel as you face it, from left to right. Every one should practice bandaging left handed, with the turns made contra-clockwise, as a number of the

Fig. 18.—Rapid ascending spiral bandage.

special bandages, such as the monocle (page 66) or the oblique of the jaw (page 59), may have to be so applied. Ambidexterity is as valuable in bandaging as in any other line of work.

The Circular Bandage (Fig. 17).—Lay the outer surface of the initial extremity on the part and hold it in place with the left hand. Carry the roller toward the right with the right hand. When the roller has about half-circled the circumference of the part, hold the initial extremity with the thumb of the right hand, and take the roller in the left. Carry the roller forward with the left hand and exactly cover

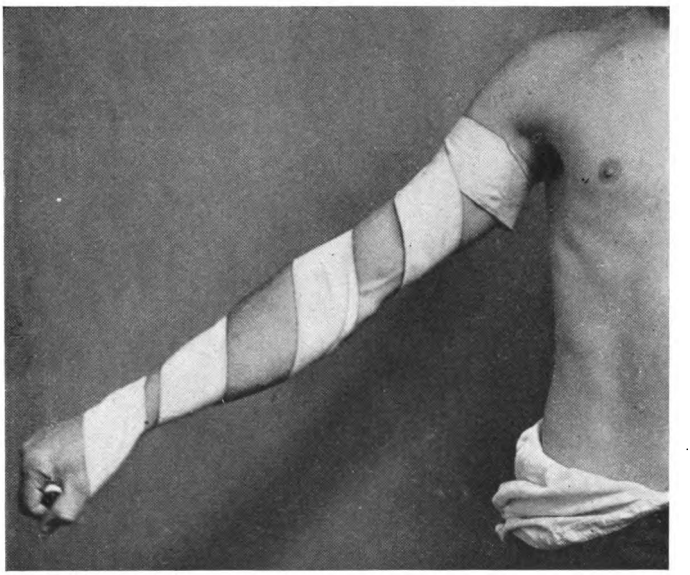

Fig. 19.—Rapid descending spiral bandage.

the initial extremity. Repeat the turn two or three times, each superimposed layer exactly covering the previous one.

The Rapid Ascending Spiral Bandage (Fig. 18).—Fasten the initial extremity with a circular turn and carry the roller in a wide spiral from the distal toward the proximal part of a limb.

The Rapid Descending Spiral Bandage (Fig. 19).—Fasten

the initial extremity with a circular turn and carry the roller in a wide spiral from the proximal to the distal part of a limb.

The rapid spiral turns are used principally as a substitute for an assistant in holding a dressing in place, thus allowing

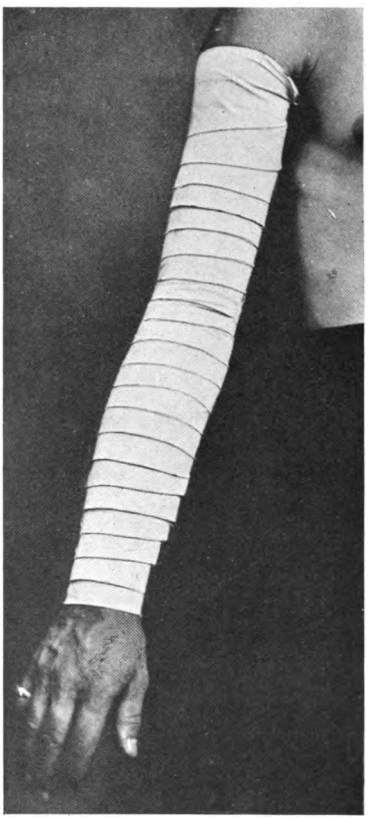

Fig. 20.—The slow ascending spiral bandage.

the operator greater freedom of the hands in applying the bandage which will properly cover and secure the dressing. They are applicable to either cylindric or conical parts.

The Slow Ascending Spiral Bandage (Fig. 20).—Fasten the initial extremity with a circular turn around the wrist, carrying the roller clockwise. Carry the roller slightly upward, forming a space (page 26) equal to one-third of the width of the bandage. Continue these turns up the forearm and arm, with the forearm extended, making the spaces exactly even throughout, until the shoulder is reached.

It will be noted that the turns lie flat on the lower part of the forearm; that they *gap* (page 24) as the forearm increases in size and becomes conical in shape; that they lie flat near the elbow and on the arm until the insertion of the deltoid is reached, where they again gap. From this it is seen that the *slow ascending spiral* turns are properly applicable to a cylindric, but should not be used on a conical, part, because on the latter the turns do not lie flat and, as a consequence, pressure is exerted by the upper portion of the bandage, while the lower portion does not come in contact with the part.

The Slow Descending Spiral Bandage (Fig. 21).—Fasten the initial extremity by a circular turn around the upper part of the arm, carrying the roller clockwise. Carry the roller slightly downward, making a space (page 26) equal to one-third of the width of the bandage. Continue these turns down the arm and forearm, with the forearm extended, making the spaces exactly even, until the wrist is reached.

A glance will show a bandage that appears to lie flat throughout. A dissection of it, however, will show many faults that have been covered up by superimposed turns. Just as much "gapping" occurred on the conical parts as was seen in the *slow ascending spiral* bandage, but the gapping portions have been wrinkled or folded up and hidden by the subsequent turns. As a consequence, irregular pressure is exerted on the underlying parts. The *slow descending spiral* bandage may be a "pretty" one, but it does not fulfil the requirements of a

perfect bandage (page 24). It should never be used on a conical part and very seldom on a cylindric part, except the thorax or abdomen, because all bandages should be applied, as far as possible, in the direction of the venous circulation, so that any pressure exerted by the various turns will have a tendency to empty the superficial veins rather than cause

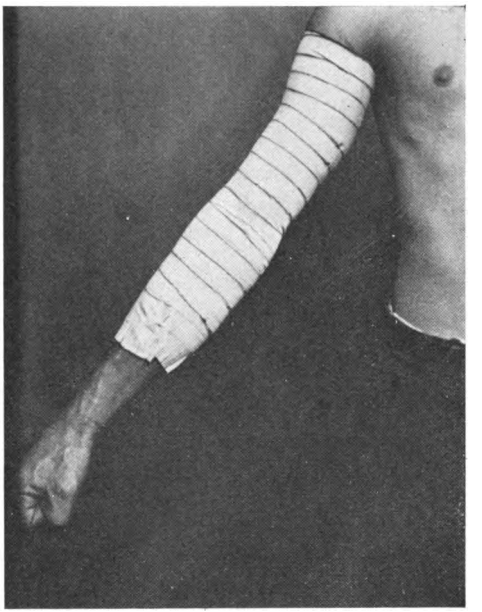

Fig. 21.—The slow descending spiral bandage.

their engorgement. The *slow descending spiral* is a splendid example of a very defective bandage.

The Reverse.—To prevent gapping (page 24) when a conical part is being bandaged, the bandage should be allowed to follow its natural course, that is, it should be allowed to lie flat, with both edges under equal tension upon the underlying structure. If the bandage were to be continued in this

direction, however, it might not agree with the course desired by the operator. To return it to the desired course a reverse is made. This reverse not only changes the direction of the bandage, but it also alters the relation of the parts of the roller (page 19) to the part being bandaged.

To make a reverse: Hold in position, with the thumb of the left hand, the lower edge of the properly placed turn. Unwind the roller for a distance about equal to twice the width

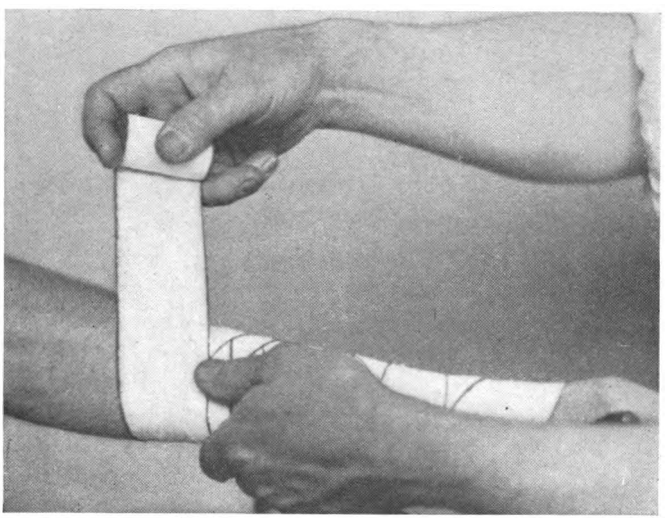

Fig. 22.—The first step in making a reverse.

of the bandage (Fig. 22); allow the unwound portion to become slack; pronate the right hand and carry the roller toward the median line of the part and downward, parallel with the long axis of the part (Fig. 23), until it is slightly below the left thumb, and then obliquely around the part being bandaged (Fig. 24). This movement will turn the slack portion of the bandage on itself, the upper border will lie lowermost, the internal surface, instead of the external, will come in

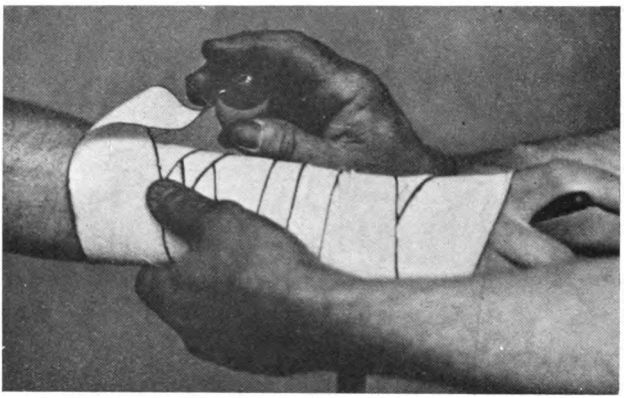

Fig. 23.—The second step in making a reverse.

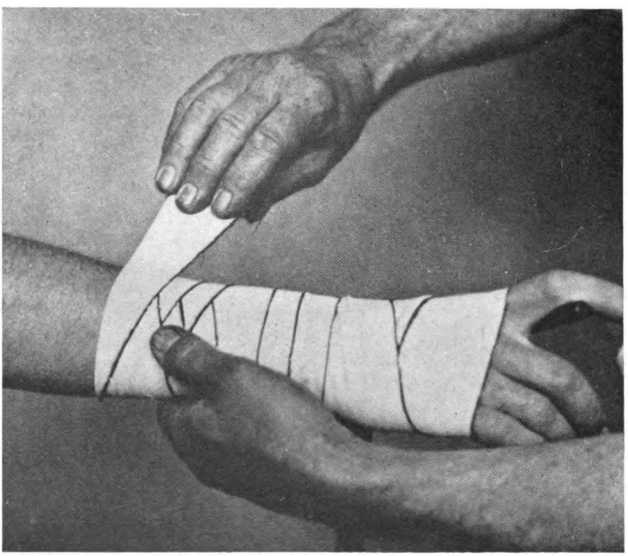

Fig. 24.—The third step in making a reverse.

contact with the part, and the roller will unwind toward the part instead of away from it. Normal relations will be re-

stored when a second reverse is made. It is essential that the bandage should be slack when the reverse is made so that the bandage will be simply folded on itself, rather than twisted, as it would be if it were taut. A twisted turn will produce uneven pressure and be very uncomfortable to the patient. It is also unsightly.

The Spiral Reverse Bandage (see Fig. 34).—The spiral reverse bandage consists of a number of consecutive spiral turns

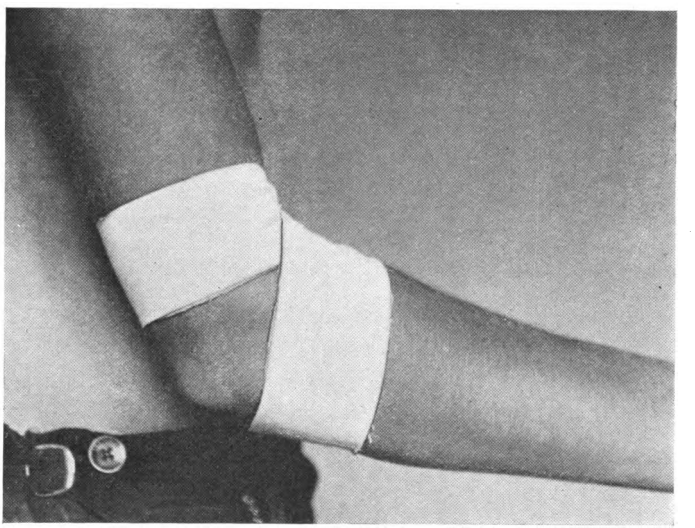

Fig. 25.—Figure-of-8 bandage.

that have been reversed. If properly applied, the reverses, or the crosses made by the reverses, will lie in a straight line parallel with the long axis of the part. The crosses will lie in the desired straight line, invariably, if the spaces on either side of the crosses are of exactly the same width. If the spaces vary in width, the line of crosses will deviate toward the wider space. As a series of reverses, if properly made, forms

a very presentable bandage, there is a great tendency to use the reverse much more often than is necessary. It should be used only when the natural course of the bandage is not the course desired by the operator (page 24).

The Figure-of-8 Bandage (Fig. 25).—The figure-of-8 bandage consists of two loops and a cross made in the form of the figure 8. Either loop, both loops, or the cross may be

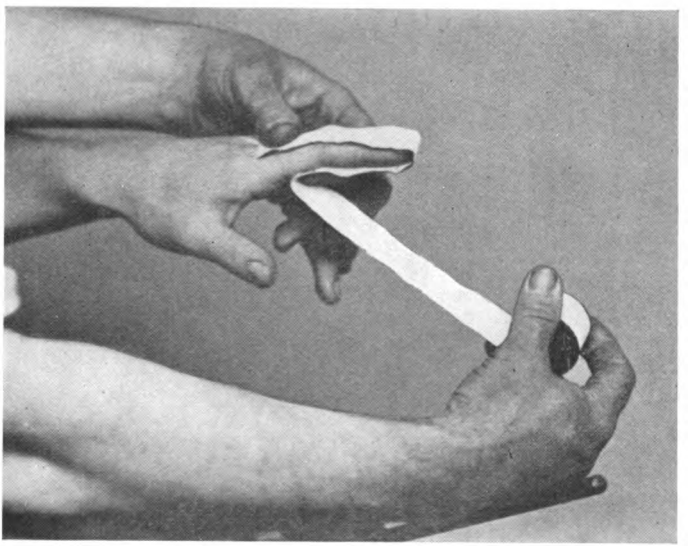

Fig. 26.—The recurrent bandage.

utilized in holding a dressing in place. When a series of figure-of-8 turns are applied, with proper spacing between them, they form an imbrication generally known as a *spica* (see Fig. 32).

Flex the forearm on the arm. Fasten the initial extremity by a circular turn around the upper part of the forearm. Carry the roller obliquely across the inner surface of the bend of the elbow, around the posterior surface of the lower

part of the arm, obliquely downward and inward over the first oblique turn over the inner surface of the bend of the elbow, and back to the point of starting. This illustrates the figure-of-8 turn, one loop being around the forearm, one around the arm, with the cross over the inner surface of the bend of the elbow.

The Recurrent Bandage (Fig. 26).—As their name implies, recurrent turns recur over the part being bandaged, as is seen in covering the top of the head, the end of a finger, or the end of a stump.

Hold the initial extremity on the base of a finger, and carry the roller forward along the dorsum of the finger, over the end, and backward along the palmar surface of the finger. Then carry it forward and along the palmar surface of the finger, over the end, and backward along the dorsum. These are recurrent turns. They are held in place by various turns entirely covering them or by circular turns which fasten their ends.

SPECIAL BANDAGES

BANDAGE OF ONE FINGER. (Fig. 27.)

Uses.—To hold a dressing or a splint on a finger.

Roller 1 inch wide.

The finger, with the hand pronated, should be extended toward the operator.

Fasten the initial extremity by a circular turn around the wrist, carrying the roller clockwise over the back of the wrist. Carry the roller from the side of the wrist on which it ascends obliquely forward across the back of the hand to the dorsal surface of the base of the finger, and then to the tip of the finger by rapid descending spiral turns. If the tip of the finger is to be covered, make two or three recurrent turns (page 40), carrying them up the finger far enough to make

certain they will be held securely in place by the subsequent turns, and making them so free over the tip of the finger that there will be no pressure on it or on the finger-nail. After the last recurrent turn has been placed, make a reverse and carry the roller around the distal phalanx of the finger, from left to right, and then cover the entire finger by slow ascending spiral turns (page 34), the roller being carried clockwise.

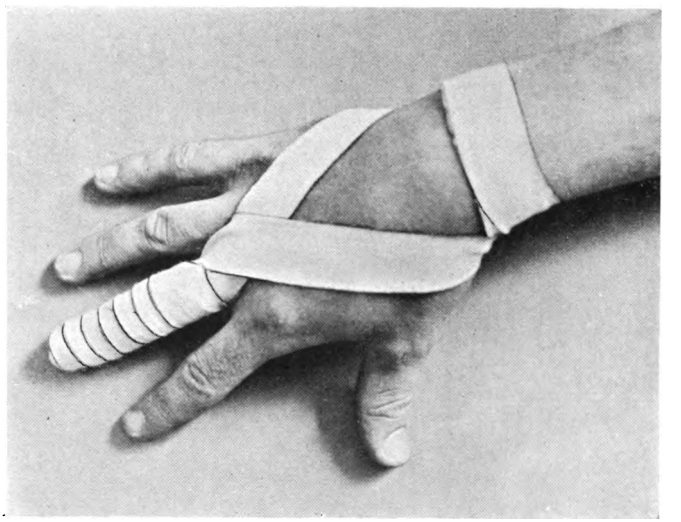

Fig. 27.—Bandage of one finger.

The spaces should be even and should equal about one-third the width of the bandage. When the web of the finger is reached, make one extra turn and then carry the roller obliquely across the back of the hand. Complete the bandage by a circular turn around the wrist.

In most instances the slow ascending spiral turns will lie perfectly flat. If they do not, any gapping (page 24) may be overcome by allowing the bandage to take its natural course

and completing the turn with a reverse (page 35) or by a figure-of-8 turn.

A **"finger cot" bandage** (Fig. 28) may be used instead of the one above described when the patient objects to the turns around the wrist and over the hand. It is very easily displaced and readily pulled off, although this objection may

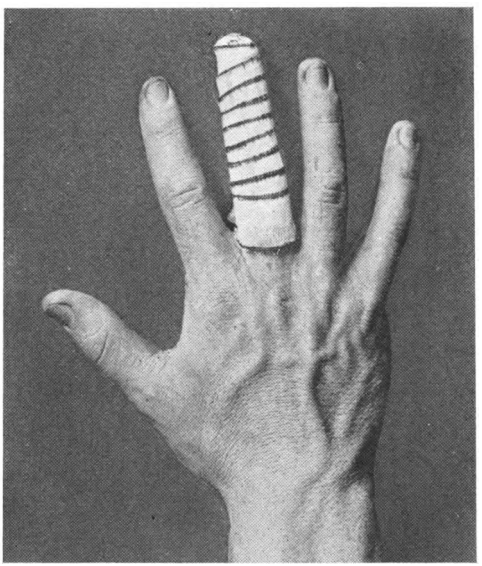

Fig. 28.—The "finger cot" bandage.

be overcome by running a strip of adhesive plaster over the bandage and on to the back of the hand.

Roller 1 inch wide.

The finger should be extended, with the hand pronated, toward the operator.

Cover the tip of the finger by two or three recurrent turns (page 40), carrying them up the finger far enough to make certain they will be securely held in place by the subsequent

turns, and making them so free over the tip of the finger that no pressure will be exerted on it or on the finger-nail. After the last recurrent turn has been placed, make a reverse near the end of the finger and cover the entire finger by slow ascending spiral turns (page 34), carrying the roller clockwise and making the spaces equal and about one-third the width of the bandage. Fasten the end by a strip of adhesive.

DEMIGAUNTLET. (Fig. 29.)

Uses.—To hold a dressing on the back of the hand.

Roller 1 inch wide.

The hand should be pronated and extended toward the operator.

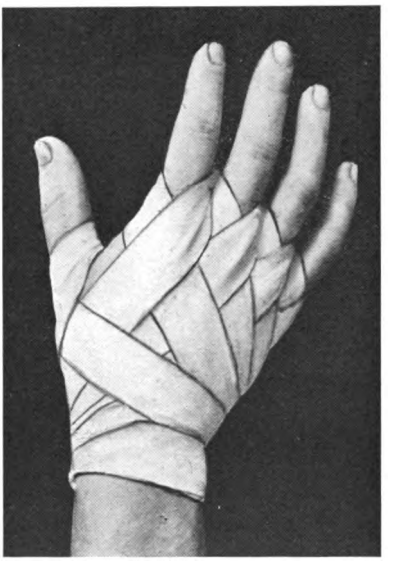

Fig. 29.—The demigauntlet.

Fasten the initial extremity by a circular turn around the wrist, the roller passing clockwise across the back of the

wrist. Carry the roller forward to the dorsum of the digit nearest to the roller as it ascends in circling the wrist. (This would be to the little finger on the right hand, and to the thumb on the left hand.) Make a loop around the base of the digit, carry the roller obliquely across the back of the hand to the opposite side of the wrist, and make a circular turn. Carry the roller to the base of the next digit, make a loop around its base, and return obliquely across the dorsum of the hand to the wrist. Make a circular turn and repeat the same procedure until the base of each digit has been looped. Complete the bandage by a circular turn around the wrist.

If the bandage has been applied as described, the palm will be free from all turns, and the crosses on the back of the hand will be interwoven and thus made more secure.

(The usual description—Wharton, Hopkins, Eliason—of the demigauntlet carries the first oblique turn across the dorsum of the hand to the base of the digit most distant from the roller as it ascends in circling the wrist, and works toward the nearest. This procedure prevents interweaving of the turns on the dorsum of the hand, thus making the completed bandage more liable to displacement. Wharton fixes his turns by an oblique one "across the back of the hand, passing between the index-finger and the thumb." Davis interweaves his turns.)

THE GAUNTLET. (Fig. 30.)

Uses.—To hold dressings or splints on the fingers and back of the hand. The turns are applicable to as many fingers as require treatment.

Roller 1 inch wide.

The hand should be extended, in pronation, toward the operator.

Fasten the initial extremity by a circular turn around the wrist, the roller passing clockwise over the back of the wrist. Carry the roller forward to the dorsum of the base of the digit nearest to the roller as it ascends in circling the wrist. (This would be to the little finger of the right hand and to the thumb on the left hand.) Carry the roller by rapid descend-

Fig. 30.—The gauntlet.

ing spiral turns (page 32) to the middle of the distal phalanx. Make a circular turn and then cover the finger by slow ascending spiral turns (page 34), making the spaces equal one-third the width of the bandage, until the web of the finger is reached. Carry the roller obliquely across the back of the hand, from left to right, and make a circular turn around the wrist.

Carry the roller obliquely forward across the back of the hand to the dorsum of the base of the next finger and bandage it in the same manner as the first. Repeat the same procedure until the remaining fingers are bandaged, and complete the bandage by a circular turn around the wrist.

Fig. 31.—The gauntlet—palmar view.

In placing the slow ascending spiral turns do not attempt to pass the roller between the fingers. Allow the fingers to remain straight. When the roller reaches the back of the finger, hold the turn between the thumb and index-finger of the left hand. Unroll the bandage far enough to allow the roller to be carried beyond the ends of the fingers, and then slip the single thickness of bandage, edgewise, between the

fingers and complete the turn. Pass the roller to the left hand; hold the turn between the thumb and index-finger of the right hand; carry the roller beyond the ends of the fingers, and slip the single thickness of bandage, edgewise, between the fingers and carry it to its proper position. In this manner a complete gauntlet may be applied with little discomfort to the patient, who might be caused considerable pain by attempts to force the roller between the fingers, or by holding the fingers "out of the way" in a flexed position.

If the bandage has been applied as described, the palm will be free from all turns (Fig. 31) and the crosses on the back of the hand will be interwoven and thus made more secure (see Fig. 30).

SPICA OF THE THUMB. (Fig. 32.)

Uses.—To hold a dressing or splint on the thumb or as a part of a gauntlet bandage (page 44).

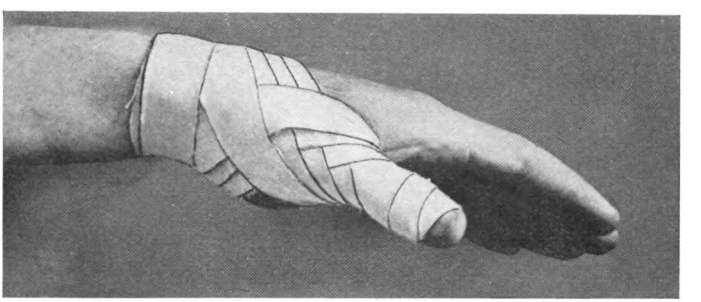

Fig. 32.—Spica of the thumb.

Roller 1 inch or 1½ inches wide.

The hand and forearm, in semipronation, should be extended toward the operator.

Fasten the initial extremity by a circular turn around the wrist, carrying the roller clockwise. Carry the roller from

the side of the wrist on which it ascends obliquely forward to the root of the thumb and then by rapid descending spiral turns (page 32) to its tip. If the end of the thumb is to be covered, make two or three recurrent turns (page 40), carrying them far enough up the thumb to make certain they will be held securely in place by the subsequent turns, and making them so free over the tip that there will be no pressure on it or on the thumb-nail. After the last recurrent turn has been made, make a reverse and carry the roller, clockwise, around the distal phalanx. Cover the thumb as far as the beginning of its web with slow ascending spiral turns (page 34), with spaces even and equal to about one-third the width of the bandage. When the web has been reached, carry the roller obliquely upward over the dorsum of the thumb to the wrist, around the wrist and back to the thumb, where it crosses the preceding oblique turn in the median line and completes a figure-of-8 (page 39). Repeat these figure-of-8 turns with ascending spaces until the entire thumb has been covered. Complete the bandage by a circular turn around the wrist.

It will be noted that one set of loops is made around the wrist, the other around the thumb, with the crosses in the median line in the form of an imbrication, generally known as a *spica* (page 39).

BANDAGE OF THE HAND. (Fig. 33.)

Uses.—To retain a dressing or a splint on the hand, or as the first part of a bandage of the forearm.

Roller 2 inches wide.

The hand should be extended, in pronation, toward the operator.

Fasten the initial extremity at the wrist by the circular or oblique method (page 28), carrying the roller clockwise. As it ascends in circling the wrist, carry it, in its natural course,

obliquely downward across the back of the hand, around the border of the hand, across the palm to a level of the distal phalanx of the finger. Make a circular turn. As the roller ascends after making the circular turn, make a space equal to about one-half of the width of the bandage. Carry the roller obliquely upward, in its natural course, across the back

Fig. 33.—Bandage of the hand.

of the hand and make two or three figure-of-8 turns (page 39), one set of loops being above the thumb, the other below the thumb, with the crosses in the middle line of the back of the hand. The last turn below the thumb will probably wrinkle as it encroaches on the web of the thumb. Complete the bandage by a circular turn around the wrist, or continue, if desired, up the forearm with slow ascending spiral turns.

The figure-of-8 bandage of the hand is more secure than one made with reverses on the back of the hand, although the latter are frequently used in preference to the figure-of-8.

SPIRAL REVERSE OF THE FOREARM. (Fig. 34.)

Uses.—To hold dressings or splints on the forearm.

Bandage 2 inches wide.

The hand and forearm should be extended toward the operator with the hand pronated. This is the easiest and most natural position for the patient, and corresponds with the position in which the hand naturally hangs by the side of the body.

All bandages of the forearm should start around the wrist and be carried around the hand either as a figure-of-8 turn alone or combined with a circular turn. These are advisable in all instances because they tend to prevent edema of the hand and because they more surely fix the initial extremity.

Fasten the initial extremity at the wrist by the circular or oblique method, carrying the roller clockwise. As the roller ascends in circling the wrist, carry it diagonally across the back of the hand, around the hand and diagonally across the dorsum of the hand to the wrist, crossing the first diagonal turn in the median line. Carry the roller around the wrist and begin covering the forearm with slow ascending spiral turns (page 34), making the spaces (page 26) equal about one-third the width of the bandage. As soon as the slow ascending spiral turns begin to gap (page 24) reverses (page 35) must be made. Allow the bandage as it ascends in circling the forearm to take its natural course, so that the bandage will lie perfectly flat with both edges exerting an even pressure. This will throw the bandage off the desired course. To return the roller to the proper direction, unroll the ban-

dage for a distance equal to twice the width of the roller. Hold the lower border of the last turn with the thumb of the left hand. Allow the unwound portion of the bandage to become slack. Pronate the right hand and carry the roller

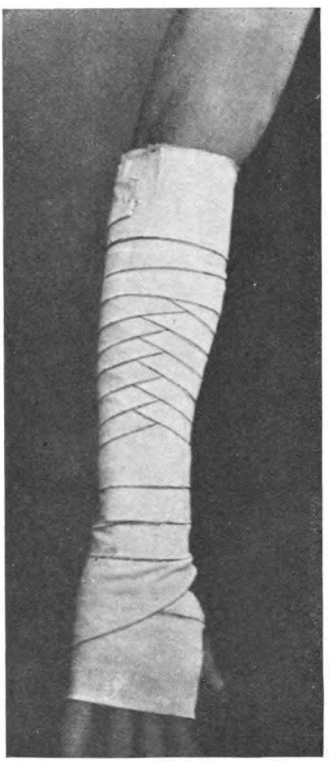

Fig. 34.—Spiral reverse of the forearm.

toward the median line of the forearm and downward parallel with the long axis of the forearm until it is slightly below the left thumb. Carry the roller to the right, laying the upper border of the bandage, which now becomes lowermost, in

such a position that the space made will equal the other spaces already made. Carry the roller toward the back of the forearm. Pass the roller from the right to the left hand and pull with the left just enough to make the reversed turn lie snug against the limb. Carry the bandage to the front of the forearm, allowing it to lie perfectly flat against the limb, and pass the roller to the right hand. Hold the lowermost edge of the bandage where it crosses the preceding turn with the thumb of the left hand and continue as above. Continue spiral reverse turns until the cylindric portion of the forearm is reached. Cover the remainder of the forearm with slow ascending spiral turns.

The completed bandage should show a line of crosses in a straight line, parallel with the long axis of the forearm. The spaces must be even and regular or the line of crosses will deviate from the straight line toward the wider space.

FIGURE-OF-8 OF THE ELBOW. (Fig. 35.)

Uses.—To retain dressings on the posterior surface of the elbow.

Bandage 2 inches wide. This bandage is applicable only when the elbow is somewhat flexed.

The operator should stand at the side of the patient.

Fasten the initial extremity by a circular turn around the elbow, the middle of the bandage lying exactly over the olecranon process. Carry the roller slightly upward and around the arm, overlapping the upper half of the circular turn; then slightly downward and around the forearm, overlapping the lower half of the circular turn and bringing the upper edge of this turn in contact with the lower edge of the preceding one at the tip of the elbow. Then continue with figure-of-8 turns (page 39), one set of loops ascending on the arm and covering two-thirds of the preceding turn, the other descending on the

forearm and covering two-thirds of the preceding turn, the

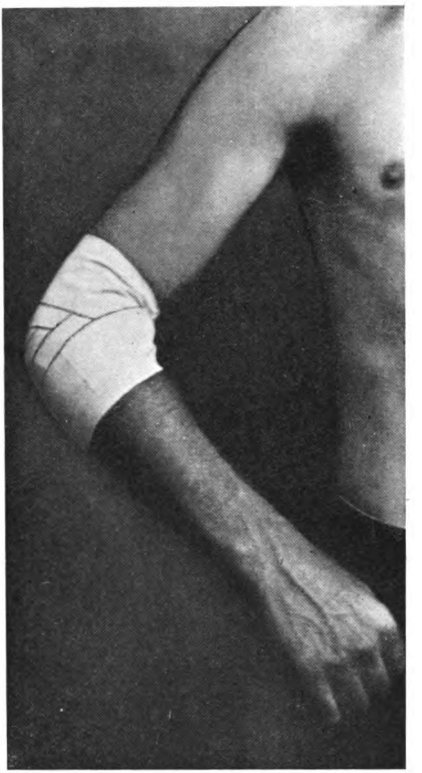

Fig. 35.—Figure-of-8 of the elbow.

crosses resting on each other in the bend of the elbow. Three or four turns are sufficient usually.

SPICA OF THE SHOULDER. (Fig. 36.)

Uses.—To hold dressings or splints on the shoulder, when the use of the arm is not to be entirely restricted.

Bandage $2\frac{1}{2}$ or 3 inches wide.

The operator should face the lateral aspect of the shoulder to be bandaged.

Fix the initial extremity by a circular turn around the middle of the arm, carrying the roller clockwise. Carry the bandage upward on the arm with slow ascending spiral turns (page 34), making the spaces equal one-third the width of the bandage. When gapping is caused by the deltoid

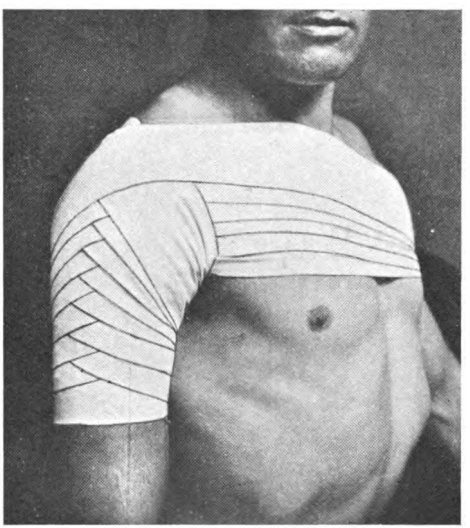

Fig. 36.—Spica of the shoulder.

muscle, let the bandage take its natural course as it ascends around the arm, and make a reverse (page 35) with the cross in the median line of the outer or lateral aspect of the arm. Continue spiral reverse turns, making the spaces uniform and equal and the crosses in a straight line until the level of the axillary fold is reached. Then carry the roller across the front of the chest if the right shoulder is being bandaged; across the back if the left shoulder is being ban-

daged, below the axilla of the sound side and across the back or front of the chest, as the case may be, to the affected arm. Carry the roller around the arm, making the first cross of the spica (page 39) in line with the crosses of the reverses. Continue these figure-of-8 turns, one loop around the body and the other around the arm and shoulder, with the crosses in the median line of the outer or lateral aspect of the arm, until the entire shoulder has been covered. Fasten the end with a safety-pin or a strip of adhesive at any convenient point.

If the spacing is not followed closely when the figure-of-8 turns are commenced, the bandage will be defective, as the last spiral reverse turn will be evident and can be dislodged readily. If the spaces are equal throughout, the crosses will be in a straight line, it will be impossible to see where the spiral reverse turns ended and the figure-of-8 turns began, and the last spiral reverse turn will be well secured.

The spaces on the chest should gradually decrease, in fan shape, from the shoulder to the axilla of the sound side. If the figure-of-8 turns are started lower than the axillary fold, they will bind the arm to the side of the chest. The loops of the figure-of-8 turns passing under the axilla of the affected side will be more or less wrinkled.

If the dressing to be held in place by the bandage does not extend down the arm, the spica of the shoulder may be started by a circular turn around the arm at the level of the axillary fold; or by the small loop of the figure-of-8 turn, the initial extremity resting on the posterior part of the shoulder and being secured by the first cross of the spica.

A descending spica of the shoulder is described by some authors. In this the spica turns begin high up on the neck and descend until the shoulder is properly covered. It has no advantages over the ascending spiral.

FIGURE-OF-8 OF HEAD AND NECK. (Fig. 37.)

Uses.—To retain dressing on the back of the neck.

Roller 1½ or 2 inches wide.

The operator and patient should face each other.

Place the initial extremity on the right temple and carry the roller horizontally across the forehead and around the head to the point of starting, where the initial extremity is

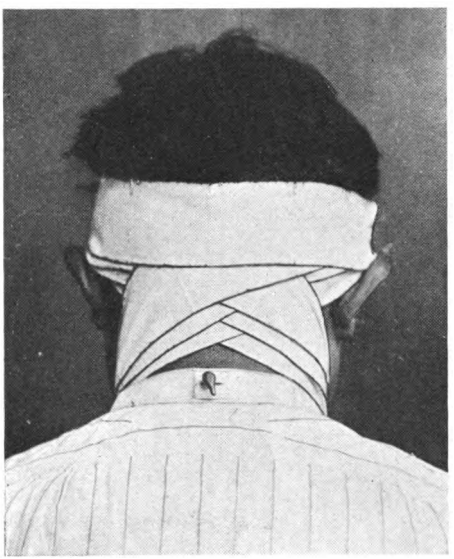

Fig. 37.—Figure-of-8 of head and neck—posterior view.

secured. Carry the roller backward, exactly overlapping the first turn, until the level of the left ear is reached, and then downward to the median line of the back of the neck. Pass the roller to the left hand and carry it downward and forward around the front of the neck. Pass the roller to the right hand and carry it backward to the mastoid, then upward, crossing the preceding turn in the median line; then forward

and around the head. Continue the figure-of-8 turns with ascending spaces on the back of the neck until the dressing is covered. Complete the bandage with a circular turn around the head.

FIGURE-OF-8 OF HEAD AND CHIN. (Hunter's V-bandage, Fig. 38.)

Uses.—To hold dressings on the chin or lower lip when it is not necessary to restrict the movement of the lower jaw.

Roller 1½ or 2 inches wide.

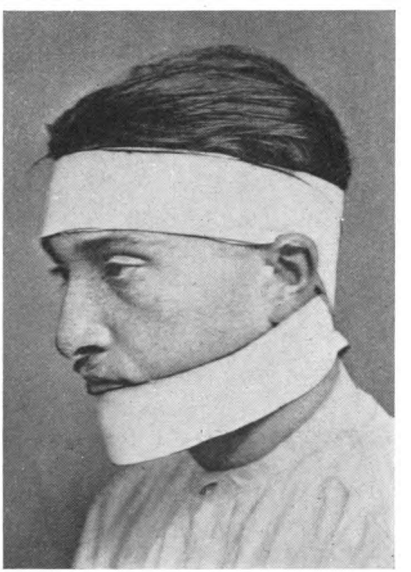

Fig. 38.—Figure-of-8 of head and chin.

The operator and patient should face each other.

Place the initial extremity on the right temple and carry the roller horizontally across the forehead and around the head, covering and fixing the initial extremity. Carry the roller horizontally backward, exactly covering the first turn

until it is over the left mastoid, then downward and backward to the back of the neck. Change the roller to the left hand and carry it forward along the right side of the jaw, around the chin, backward, in the right hand, along the left side of the jaw, to the back of the neck. Pass the roller to the left hand and carry it upward and forward around the vault of the cranium and back to the nape of the neck. Make two or three of these figure-of-8 turns around the forehead and chin and complete the bandage by a circular turn around the head.

OCCIPITOFRONTAL BANDAGE. (Fig. 39.)

Similar to a "bandage for the front of the scalp," described by G. G. Davis.

Uses.—To hold a dressing on the forehead, front part of the scalp, or the occiput; as the first turns of the transverse recurrent bandage of the scalp.

Bandage 1½ or 2 inches wide.

The operator and patient should face each other.

Place the initial extremity on the right temple and carry the roller toward the left, horizontally, around the head to the point of starting, where the initial extremity is secured. Continue the bandage horizontally across the forehead and backward until it reaches the left ear; then carry the roller slightly downward and around the occiput, making a space which gradually increases in width from the ear to the median line of the occiput, where it equals one-third the width of the bandage, and gradually decreases from the median line of the occiput to the right ear, where the bandage crosses the preceding turn. Carry the roller forward and around the forehead, making a space which gradually increases from the ear to the median line of the forehead, where it equals one-third the width of the bandage and gradually decreases from the

median line of the forehead to the left ear, where it crosses the preceding turn. Continue similar turns until the bandage begins to gap (page 24) either on the front part of the

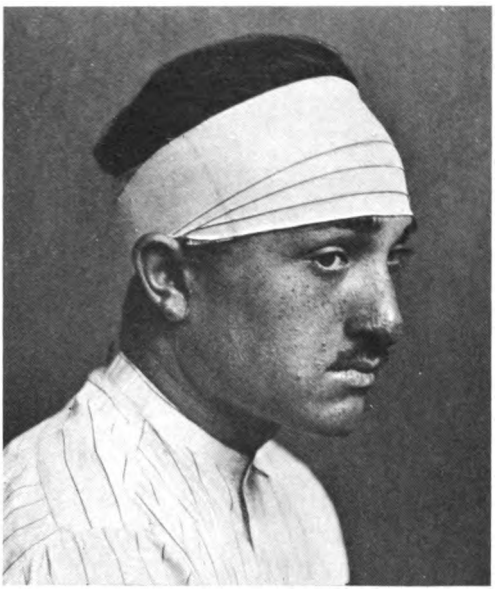

Fig. 39.—Occipitofrontal bandage.

scalp or below the occiput. Fasten the end of the bandage over either temple, or reverse the roller and complete the bandage by a circular turn around the head.

OBLIQUE OF THE JAW. (Fig. 40.)

Uses.—For fracture of the condyle of the inferior maxilla; to hold a dressing on the lower jaw, under the chin, or on the cheek.

Roller 1½ or 2 inches wide.

The operator and patient should face each other.

Place the initial extremity on the temple of the sound side and carry the roller horizontally across the forehead toward the temple of the affected side and around the head, covering and fixing the initial extremity. Then carry the roller horizontally backward, exactly covering the first turn until it is over the mastoid process of the affected side. Carry it obliquely downward and backward around the head below the occiput, forward around the neck, under the jaw, and

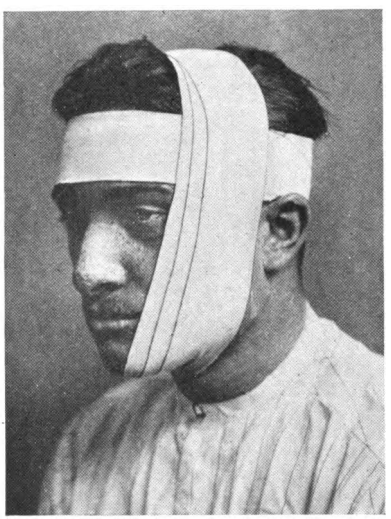

Fig. 40.—Oblique of the jaw.

upward over the cheek of the affected side, the upper edge of the bandage hooking on the lateral aspect of the chin and just missing the angle of the mouth and the external angle of the eye. Carry the roller diagonally backward across the head, back of the ear on the sound side, under the jaw and vertically upward on the face, this turn overlapping the preceding one to make a space which begins just beyond the ear, gradually increases until it equals about one-third of the

width of the bandage as it passes onto the face, is even on the face and to the top of the head, and then gradually decreases until the turn reaches the back of the ear, where it exactly covers the preceding turn. Make two or three similar turns with similar spacing until the lower jaw is covered. Complete the bandage by making a reverse over either temple and carrying a circular turn around the head.

DOUBLE OBLIQUE OF THE JAW. (Fig. 41.)

Uses.—For fracture of the inferior maxilla; to hold a dressing on the jaw.

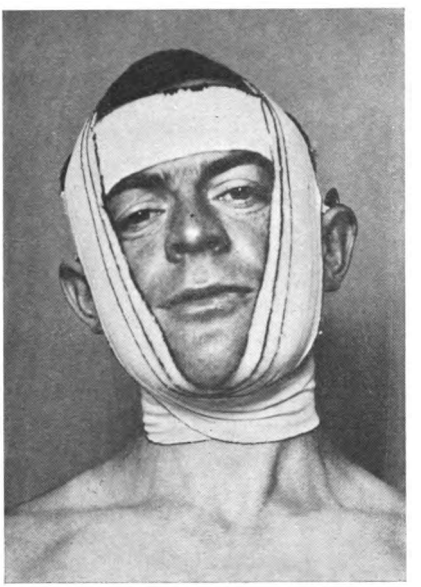

Fig. 41.—Double oblique of the jaw.

Roller $1\frac{1}{2}$ or 2 inches wide.

The operator and patient should face each other.

Place the initial extremity on the right temple and carry the roller toward the left, horizontally, around the head and back to the point of starting, where the initial extremity is secured. Continue the bandage horizontally across the forehead and backward until it reaches the left ear; then obliquely downward and backward below the occiput; forward, around the right side of the neck; under the lower jaw; up-

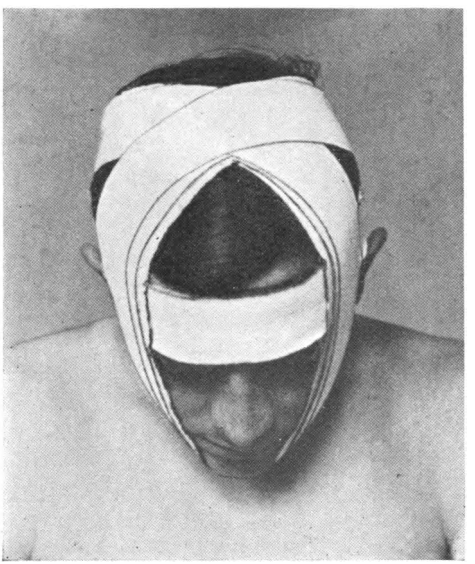

Fig. 42.—Double oblique of the jaw from above.

ward over the left cheek, the anterior edge of the bandage just missing the angle of the mouth and the external angle of the left eye. Carry the roller obliquely backward across the top of the head; downward between the right parietal eminence and the right ear; backward below the occiput; forward around the left side of the neck; under the lower jaw; upward over the right cheek, the anterior (upper) edge of the

bandage just missing the angle of the mouth and the external angle of the right eye. Carry the roller over the head, obliquely, crossing the first oblique turn in the median line (Fig. 42); downward between the left parietal eminence and the left ear; backward below the occiput; forward around the right side of the neck; under the lower jaw; upward over the left cheek, overlapping the preceding turn two-thirds. Follow the preceding turns, spacing on either side of the face until the jaw on either side has been covered. Complete the bandage by making a reverse turn over either temple and securing the various turns by a circular one around the head.

BARTON'S BANDAGE. (Fig. 43.)

Uses.—To hold the lower jaw firmly against the upper with as much upward and backward pressure as required; to hold a splint on the lower jaw; to hold a dressing on the chin; as a suspension apparatus during the application of a plaster jacket.

Roller 2 inches wide.

The operator and patient should face each other.

Hold the initial extremity, with the left hand, below the occipital protuberance. Carry the roller in the right hand forward and upward on the right side of the head close to, and behind, the right ear, obliquely across the scalp to the middle of the left temporal region, downward over the left cheek, under the jaw, upward over the right cheek, obliquely across the scalp, crossing the first turn made over the scalp exactly in the median line of the head (Fig. 44); then close to, and back of, the left ear and to the point of starting, where the initial extremity is crossed and fixed. Pass the roller to the left hand and carry it horizontally forward along the right side of the lower jaw, and around the chin. Change the roller to the right hand and carry it backward along the

Fig. 43.—Barton's bandage—side view.

Fig. 44.—Barton's bandage—front view.

left side of the jaw to the point of starting. Then carry the roller over the same course twice more, each turn exactly covering the preceding one. Fasten the end with a piece of adhesive plaster or a safety-pin.

Strips of adhesive plaster may be placed over the final turn, or safety-pins may be placed at the points of crossing on either side of the chin and on top of the head to make the bandage more secure, although a properly applied Barton bandage will not require reinforcement.

GIBSON'S BANDAGE. (Fig. 45.)

Uses.—Fracture of the body of the inferior maxilla; to immobilize the lower jaw after dislocation; to retain dressings or splints on the lower jaw.

Roller 1½ or 2 inches wide.

The operator and patient should face each other.

Place the initial extremity on the temple of the injured side. Carry the roller across the top of the head to the opposite temple, downward over the cheek, under the jaw and upward over the cheek of the injured side, to the point of starting. Repeat this turn twice, exactly overlapping the preceding one. These vertical turns should ascend on the injured side (Hopkins). After ascending to the temple the third time, make a reverse which should be held with the free hand, and carry the roller around the head. Repeat this turn twice, each turn exactly covering or overlapping the preceding one. Carry the roller horizontally backward until it is over the mastoid process; then obliquely downward and backward around the nape of the neck, horizontally forward along the side of the lower jaw, around the chin, and backward along the side of the jaw to the nape of the neck. Repeat this turn twice, each turn exactly overlapping the preceding one. After the roller has reached the nape of the

neck the third time, make a reverse and carry the roller forward over the top of the head in the median line to the forehead, and fasten the end to the circular turns.

Small safety-pins should be inserted at the points of crossing of the several turns, or the bandage may be made more secure by the use of strips of adhesive plaster. Gibson's bandage is very difficult to apply to a patient having a slop-

Fig. 45.—Gibson's bandage.

ing forehead, as the vertical circular turns have a tendency to slide forward. Barton's bandage is much more useful in the majority of instances and much more easily applied.

MONOCLE, OR BANDAGE OF ONE EYE. (Fig. 46.)

Uses.—To hold a dressing on one eye or to cover one eye for protection from the light.

Bandage 1½ or 2 inches wide. The material may be either

gauze, flannel, or flannellet; muslin should not be used because it is too stiff and resistant.

The operator and patient should face each other. The ear on the affected side may be covered with a thin layer of cotton.

Place the initial extremity on the temple of the affected side and carry the roller horizontally across the forehead toward the opposite temple and around the head, covering

Fig. 46.—Monocle, or bandage of one eye.

and fixing the initial extremity. Carry the roller horizontally backward, exactly covering the first turn, until it is over the mastoid process of the sound side; then obliquely downward and around the head below the occiput and forward to the ramus of the jaw, and obliquely upward across the cheek and over the eye, the lower edge of the bandage lying against the root of the nose, at the junction of the nose with the forehead (Fig. 47). Carry the roller over the scalp

(Fig. 47), in its natural course, which would be midway between the median line of the head and the ear, and around the occiput. Carry it forward, a space being made which gradually increases from the back of the neck to the ear, where it equals one-third the width of the bandage, and gradually decreases from the ear to the root of the nose, where the bandage obliquely crosses the previous turn. Carry the roller backward, forming a space which starts at the root of

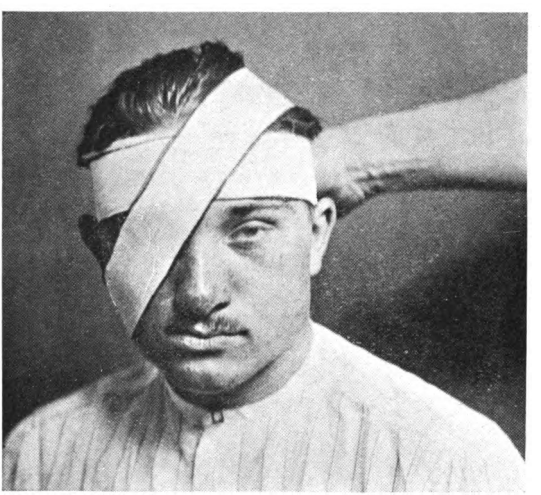

Fig. 47.—Monocle, or bandage of one eye—first turn over eye.

the nose and gradually increases until it equals one-third the width of the bandage above the ear, and then gradually decreases until the roller crosses the preceding turn at the back of the neck. Repeat these turns, with similar spacing, until the eye is entirely covered. Usually three turns around the head are sufficient. Complete the bandage by a horizontal circular turn around the head.

It will be noted that the lowest turn on one side of the

head becomes the highest turn on the other side, and that the spaces ascend on one side and descend on the other. The principal objection to this bandage is that it covers the ear.

BINOCLE, OR BANDAGE OF BOTH EYES. (Fig. 48.)

Uses.—To hold a dressing on both eyes; to protect both eyes.

Roller 1½ or 2 inches wide. The material may be gauze, flannel, or flannellet. Muslin should not be used, because it is too stiff and resistant.

The operator and patient should face each other.

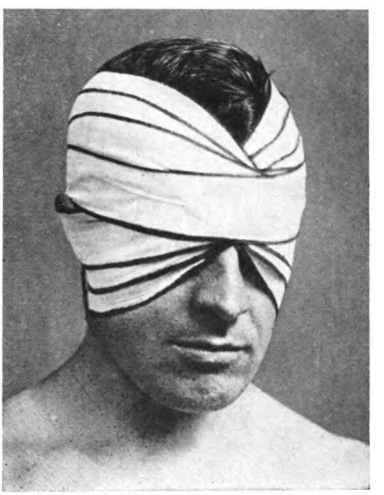

Fig. 48.—Binocle, or bandage of both eyes.

Complete a monocle, or bandage of the right eye (page 66). When the final horizontal circular turn of the monocle reaches the mastoid process of the left side, carry the roller obliquely downward and backward. Pass below the occiput and then carry the roller upward over the scalp midway between the

median line of the head and the right ear, forming an equilateral uncovered portion of the scalp on the top of the head (Fig. 49). Carry the roller obliquely downward over the left eye, the lower edge of the bandage lying against the root of the nose, at the junction of the nose with the forehead;

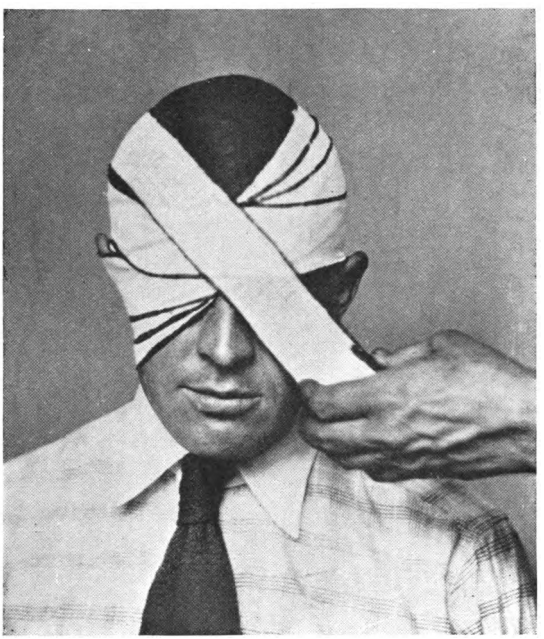

Fig. 49.—Binocle, or bandage of both eyes—first descending turn over the second eye.

obliquely downward over the left cheek and around the side of the neck to the occiput. Carry the roller over the head, forming a space which gradually increases from the occiput to the ear, where it equals one-third the width of the bandage, and gradually decreases from the ear to the root of the nose, where the bandage crosses the preceding turn. Carry

the roller downward and backward, forming a space which starts at the root of the nose and gradually increases until the ear is reached, where it equals one-third the width of the bandage, and gradually decreases from the ear to the point where the roller crosses the preceding turn below the occiput. Repeat these turns with similar spacing until the left eye is entirely covered. Usually three turns around the head are sufficient. Complete the bandage by a horizontal circular turn around the head.

It will be noted that in bandaging both eyes by this method the first eye is covered by turns carried upward, while the second eye is covered by turns carried downward; and that the turns descend on the scalp and ascend over the ear. The only objectionable feature to this bandage is that both ears will be covered.

An eye bandage used by Dr. William T. Shoemaker at the German Hospital is made as follows:

To Bandage One Eye.—Bandage 1½ or 2 inches wide. The material may be either gauze, flannel, or flannellet; muslin should not be used because it is too stiff and resistant. The operator and patient should face each other. A pad or dressing should be placed over the affected eye, the upper edge of the pad or dressing resting beneath the supra-orbital ridge.

Place the initial extremity on the temple of the affected side and carry the roller horizontally across the forehead toward the opposite temple and around the head, covering and fixing the initial extremity. Carry the roller horizontally backward, exactly covering the first turn, until the roller is over the mastoid process of the sound side. Then carry it obliquely downward and around the head below the occiput; forward, below the ear of the affected side, and obliquely upward over the cheek and the eye, the upper edge of the

bandage resting on the supra-orbital ridge. Make slight traction on the upper edge of the bandage, and carry the roller backward, almost completely overlapping the preceding horizontal turn. Repeat these turns around the head, below the ear and over the eye, until the pad or dressing is entirely covered. Complete the bandage by a horizontal circular turn around the head.

If both eyes are to be bandaged, place the initial extremity on the right temple and carry the roller horizontally across the forehead and around the head, covering and fixing the initial extremity. Carry the roller horizontally backward, exactly covering the first turn, until the roller is over the mastoid process of the left side. Then carry it obliquely downward and around the head below the occiput; forward below the right ear and obliquely upward over the cheek and the right eye, the upper edge of the bandage resting on the supra-orbital ridge. Make slight traction on the upper edge of the bandage and carry the roller backward, almost completely overlapping the preceding horizontal turn. Continue horizontally around the head, slightly overlapping the preceding turn over the right ear. When the middle of the forehead is reached, make slight traction on the upper edge of the bandage, and carry the roller downward over the left eye, the upper edge of the bandage resting on the supra-orbital ridge. Carry the roller obliquely downward over the left cheek, under the left ear, around the neck, under the right ear, obliquely upward over the right cheek and eye, almost completely overlapping the preceding turn. Continue these turns, passing alternately upward over the right eye and downward over the left eye until both eyes are covered. Complete the bandage by a circular turn around the head.

BANDAGE FOR THE EAR OR MASTOID PROCESS. (Fig. 50.)

Uses.—To hold dressings on the ear or mastoid process.

Roller $1\frac{1}{2}$ or 2 inches wide. Either gauze or flannellet should be used.

The operator should stand at the side of the patient.

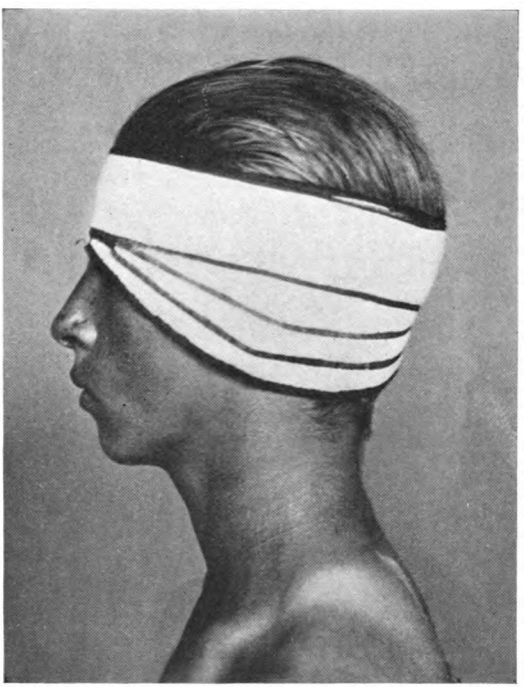

Fig. 50.—Bandage for ear or mastoid process.

Place the initial extremity on the temple of the sound side, and carry the roller horizontally across the forehead and around the head, covering and fixing the initial extremity. Continue along the same course until the temple on the affected side is reached. Carry the roller downward and back-

ward, covering and securing the lowest part of the dressing, upward and backward around the occiput to the point of starting. Continue similar turns around the head and over the ear and mastoid, making spaces which begin at the temple of the sound side gradually increase in width until they equal one-third the width of the bandage over the mastoid, and decrease until the back of the head is reached, where the roller overlaps the preceding turn. Continue these turns, with similar spacing, until the entire dressing is covered.

SKULL-CAP, OR RECURRENT OF THE SCALP, WITH SINGLE ROLLER. (Fig. 51.)

Uses.—To retain a dressing on the scalp.

Roller 1½ or 2 inches wide.

The operator and patient should face each other. An assistant is required; usually the patient can act in this capacity.

Place the initial extremity on the right temple and carry the roller horizontally across the forehead toward the left temple and around the head to the point of starting, where the initial extremity is secured. Carry the roller again around the left side of the head, exactly overlapping the preceding turn, until the occiput is reached. Make a right-angle turn, or reverse, which must be held in place by an assistant. Carry the roller forward over the top of the head, in the median line, to the lower edge of the horizontal turn. Place the forefinger of the left hand on the turn to hold it firmly in place and then make a recurrent turn by carrying the roller backward over the top of the head, covering one-half of the preceding turn, until the center of the occiput is reached. While an assistant holds the turn firmly in place make a recurrent turn and carry the bandage forward over the top of the head, covering the exposed portion of the first antero-

posterior turn. Hold this turn firmly with the left hand, make a recurrent turn backward over the top of the head on the same side of the median line as the last forward turn, and making a space which increases from the median line of the forehead to the line of the ear, where it equals one-third the width of the bandage and decreases from this point to the

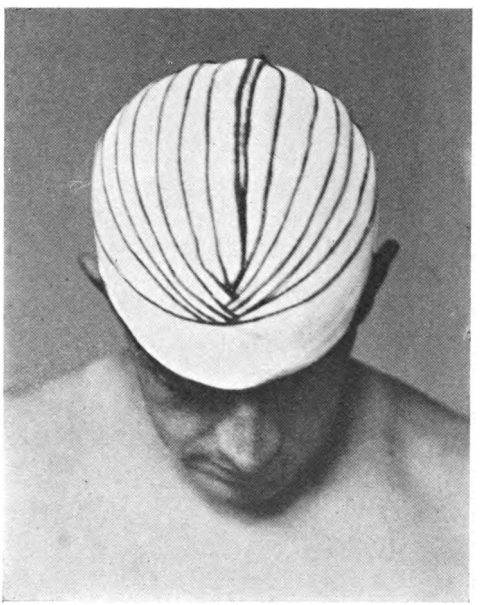

Fig. 51.—Skull-cap, or recurrent of the scalp.

center of the occiput. Carry the recurrent turn forward on the opposite side of the median line, with similar spacing. Carry the recurrent turn backward on the same side of the median line. Continue these recurrent turns forward and backward on alternate sides of the head until the entire scalp has been covered. Complete the bandage by a circular turn around the head.

SKULL-CAP, OR RECURRENT OF THE SKULL, WITH DOUBLE ROLLER.

Uses.—To retain dressings on the scalp.

Double roller (page 12) $1\frac{1}{2}$ or 2 inches wide.

The operator and patient should face each other.

Place the outer surface (page 19) of the portion of the bandage between the two rollers on the forehead (Fig. 52) and

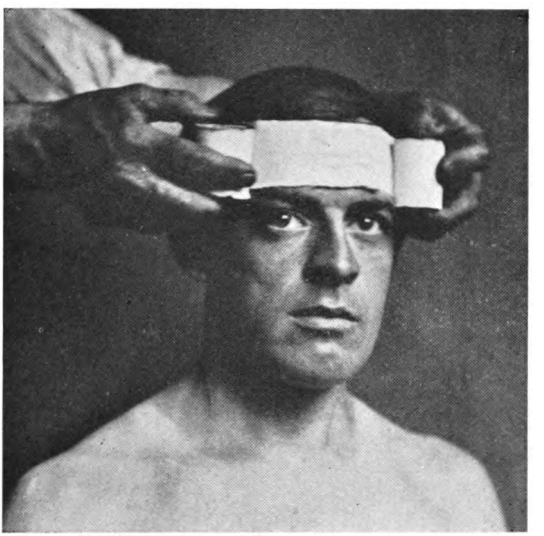

Fig. 52.—Beginning the recurrent of the scalp with a double roller.

carry the rollers horizontally backward along the sides of the head to the occiput. Pass the rollers from hand to hand and allow the roller, now in the right hand, to pass beneath the turn being made by the roller in the left hand. Carry the roller in the right hand over the top of the head, in the median line, and beyond the lower edge of the horizontal turn. Carry the roller in the left hand horizontally forward, exactly overlapping the preceding horizontal turn, and over the turn

made by the roller in the right hand. Shift the rollers from hand to hand. Carry the roller in the left hand backward over the scalp, to the right of the median line and covering one-half of the preceding anteroposterior turn. Carry the roller beyond the horizontal turn and hold the strip in place by a horizontal turn made with the roller in the right hand (Fig. 53). Pass the rollers from hand to hand. Carry the

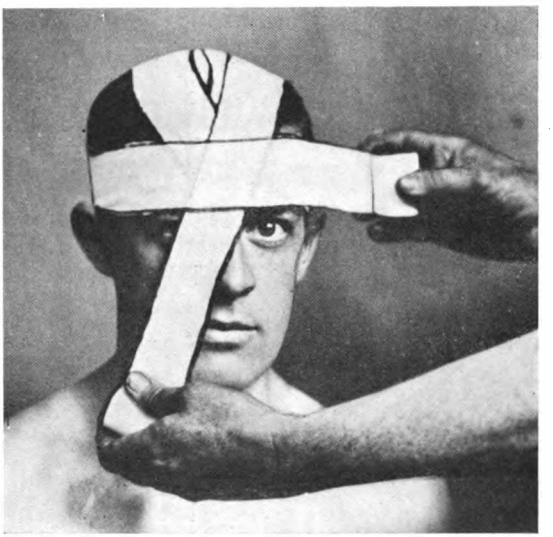

Fig. 53.—Recurrent of the scalp with double roller or two rollers—method of securing the recurrent turns.

roller in the right hand forward to the left of the median line, covering the remaining half of the original turn over the top of the head. Carry the roller beyond the median line and hold the turn in place by a horizontal one made with the roller in the left hand. Pass the rollers from hand to hand and repeat the recurrent and circular turns, forming spaces (page 26) with the former which begin in the median line at

the forehead and occiput, gradually increase until they equal one-third the width of the bandage above the ear, and then gradually decrease until the forehead or occiput is reached. After the entire scalp has been covered, complete the bandage by fastening the ends at convenient points.

Davis carries his recurrent turns upward from the circular turns rather than downward from the median line.

SKULL-CAP, OR RECURRENT OF THE SCALP, WITH TWO ROLLERS.

Uses.—To retain dressings on the scalp.

Two rollers, one $1\frac{1}{2}$ and the other 2 inches wide.

The operator and patient should face each other.

Fasten the initial extremity of the narrower roller by a circular turn around the head. Unwind about 6 inches of the wider bandage and lay the unwound portion along the median line of the scalp with the initial extremity extending beyond the horizontal turn as it crosses the forehead. Secure the wider bandage by a horizontal turn of the narrower one. Carry the wider roller backward along the median line of the scalp and beyond the circular turn. Hold it in place by a horizontal turn of the narrower roller (see Fig. 53). Pass the rollers from hand to hand and proceed as in the skull-cap made with the double roller until the scalp is entirely covered. The initial extremity of the recurrent roller may be turned upward over the circular turns at any time and fastened by the subsequent horizontal turn.

When a skull-cap is put on according to either of the last two methods, the operator must remember that every superimposed turn of the circular roller increases the pressure exerted upon the underlying structures. If the circular turns are drawn tight there may be interference with the circulation of the scalp. Either bandage is superior to the single roller

skull-cap, because no assistant is required, because greater pressure can be exerted on the top of the scalp if desired, and because either is less readily displaced.

TRANSVERSE RECURRENT OF THE SCALP. (Fig. 54.)

Uses.—To retain dressings on the scalp.

Roller 1½ or 2 inches wide.

The operator and patient should face each other until the occipitofrontal turns have been made, after which the operator should stand at the side of the patient.

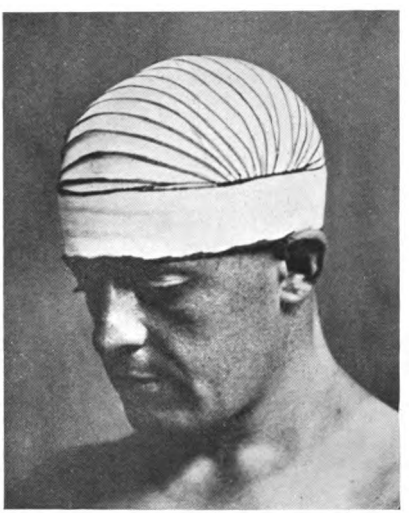

Fig. 54.—Transverse recurrent of the scalp.

Complete an occipitofrontal bandage (page 58). As soon as the upper edge of the frontal turn begins to gap, make recurrent turns (page 40) which extend from the ear on one side, across the scalp to the opposite ear, the spaces made equalling those of the occipitofrontal turns, gradually increas-

ing from one ear to the median line of the scalp, and decreasing from the median line of the scalp to the other ear. Continue the recurrent turns until the entire scalp, or as much of

Fig. 55.—Transverse recurrent of anterior portion of scalp.

it as is necessary, has been covered (Fig. 55). Complete the bandage by a horizontal circular turn around the head.

FIGURE-OF-8 OF NECK AND AXILLA. (Fig. 56.)

Uses.—To retain dressings on the shoulder or in the axilla.

Roller $1\frac{1}{2}$ or 2 inches wide.

The operator should face the lateral aspect of the shoulder to be bandaged.

Place the initial extremity on the top of the shoulder, from behind forward, and carry the roller under the axilla and over the shoulder, fixing the initial extremity by crossing it in the median line of the shoulder. Carry the roller around the

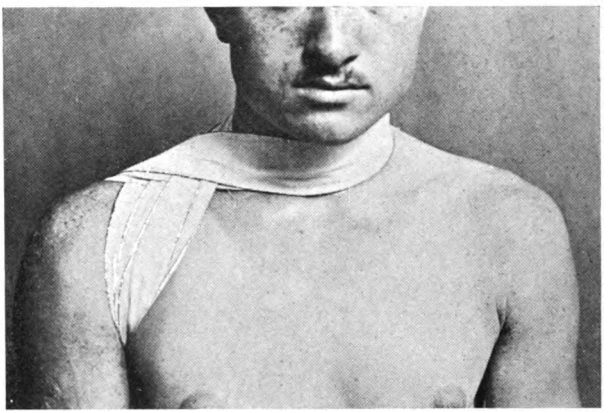

Fig. 56.—Figure-of-8 of neck and axilla.

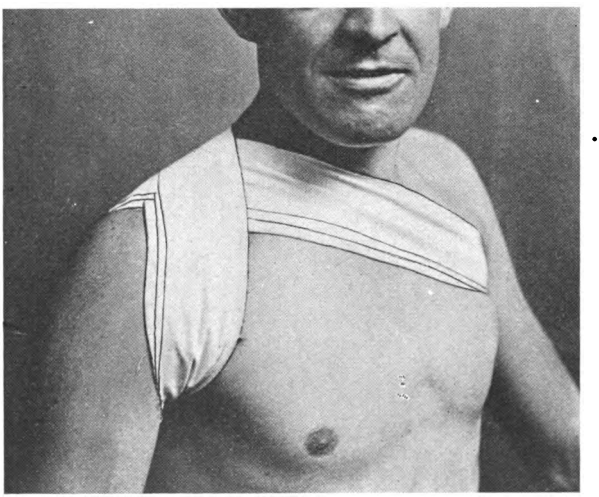

Fig. 57.—Figure-of-8 of axilla-shoulder-axilla.

neck and back to the point of starting. Make a space (page 26) equal to one-third the width of the bandage and follow the course of the preceding turn. Make as many as necessary of these figure-of-8 (page 39) turns, one loop under the

axilla and the other around the neck with the crosses ascending on the top of the shoulder.

A more firm bandage to retain dressings on the top of the shoulder may be made by carrying the second loop of the "8" under the axilla of the sound side, rather than around the neck (Fig. 57).

FIGURE-OF-8 OF BACK AND SHOULDERS. (Fig. 58.)

Uses.—To retain dressing in either axilla or on the upper portion of the back.

Fig. 58.—Figure-of-8 of back and shoulders.

Roller $2\frac{1}{2}$ or 3 inches wide.

The operator should face the patient's back.

Place the initial extremity under the left axilla and carry the roller obliquely upward across the back to the outer point

of the right shoulder, around the shoulder, under the axilla, obliquely upward across the back, crossing the first oblique turn in the median line of the back, to the outer point of the left shoulder, and under the left axilla to the point of starting. Continue these figure-of-8 turns, with ascending spaces equal to about one-third the width of the bandage, until the dressing has been covered.

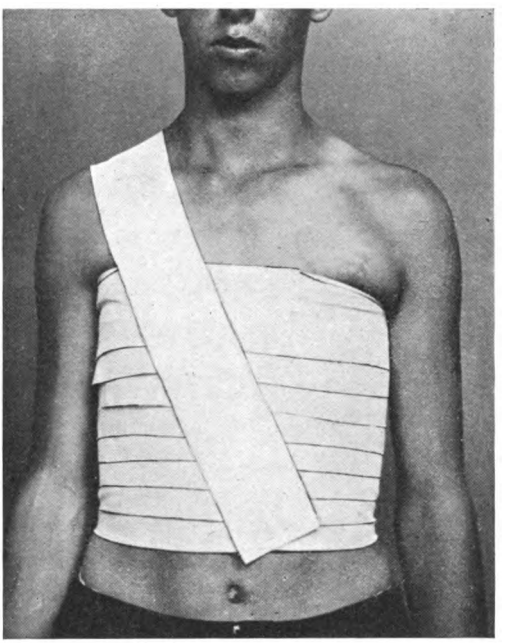

Fig. 59.—Ascending spiral of the chest.

ASCENDING SPIRAL OF THE CHEST. (Fig. 59.)

Uses.—To support the chest or to hold dressings on the chest.

Roller 3 inches wide.

The operator and the patient should face each other.

Fix the initial extremity by a circular turn around the lower part of the chest and cover the chest with slow ascending spiral turns (page 34) as high as the axillary folds. When the spine is reached in placing the last ascending spiral turn, make a reverse, pin it, and carry the roller over the right shoulder and downward over the anterior surface of the chest to the lowermost ascending spiral turn, where the bandage is ended. Fasten the vertical turn to the horizontal ones with safety-pins.

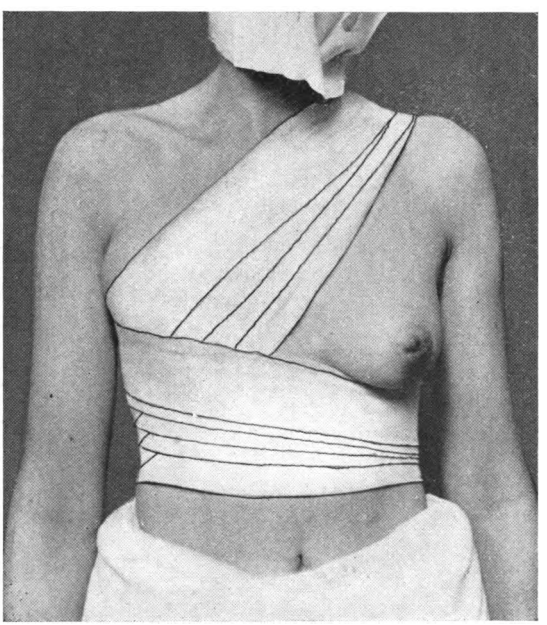

Fig. 60.—Suspensory of the breast—anterior view.

SUSPENSORY OF THE BREAST. (Figs. 60 and 61.)

Uses.—To support the breast or to retain a dressing on it.

Roller $2\frac{1}{2}$ or 3 inches wide.

The operator and patient should face each other.

Place the initial extremity under the affected breast and carry the roller toward the opposite breast and around the chest to the point of starting, where the initial extremity is covered and fixed. Make a second circular turn exactly overlapping the preceding one until the outer border of the

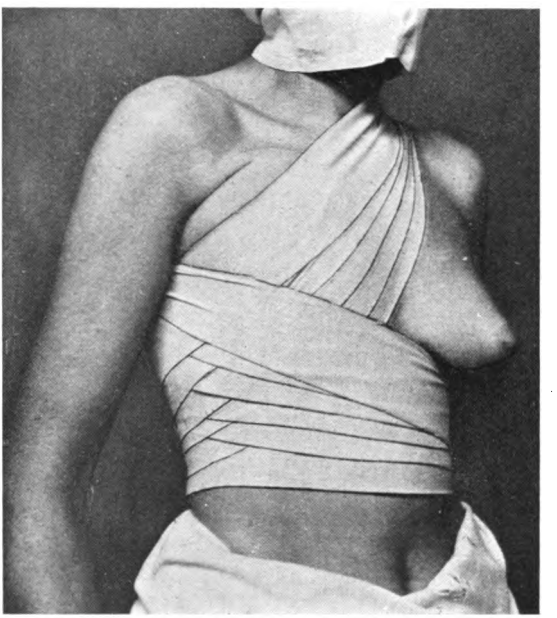

Fig. 61.—Suspensory of the breast—lateral view.

breast is reached. Carry the roller obliquely upward over the lower portion of the breast, over the shoulder of the sound side and obliquely downward across the back to the point of starting (Fig. 62). Carry the roller horizontally around the chest, making a space which equals about one-half the width of the bandage. Follow the preceding oblique turn upward over the breast and shoulder of the sound side, making a

space equal to one-half the width of the bandage. Continue with alternate circular and oblique turns until the entire breast is covered. The crosses made by the circular and

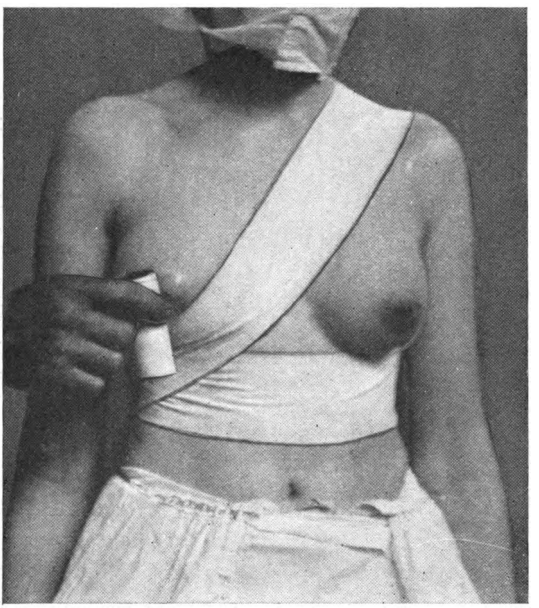

Fig. 62.—Suspensory of the breast—first oblique turn.

oblique turns should be under the breast. The spaces made by the oblique turns will gradually decrease from the breast to the shoulder.

SUSPENSORY BANDAGE OF BOTH BREASTS. (Fig. 63.)

Uses.—To support or hold dressing on both breasts.

Roller $2\frac{1}{2}$ or 3 inches wide.

The operator and patient should face each other.

Place the initial extremity under the right breast and carry the roller toward the left breast and around the chest,

covering and fixing the initial extremity. Make a second horizontal circular turn, exactly overlapping the preceding one until the outer border of the right breast is reached. Then carry the roller obliquely upward over the lower portion of the breast, over the left shoulder, diagonally downward over the back to the right side of the chest. Follow the

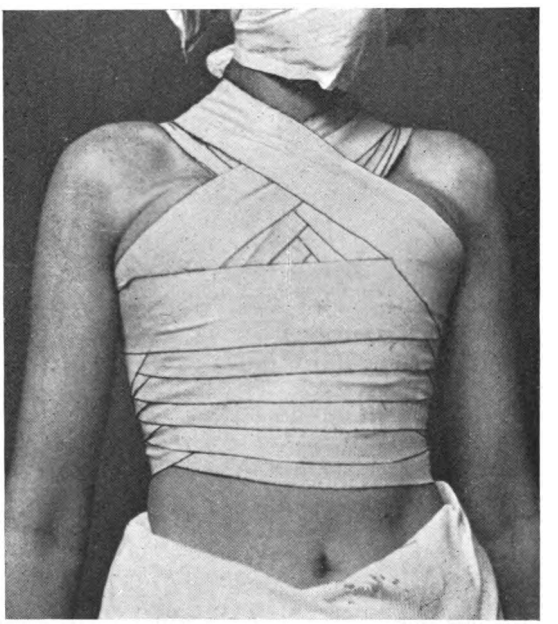

Fig. 63.—Suspensory bandage of both breasts.

first horizontal circular turn, making a space equal to one-half the width of the bandage until the outer border of the left breast is reached. Then carry the roller diagonally upward across the back, over the right shoulder, and diagonally downward toward the left breast. Lift the left breast with the left hand and carry the roller under it and horizontally

backward around the chest to the outer border of the right breast (Fig. 64). Carry the roller in the course of the upward diagonal turn across the front of the chest, making a space equal to one-half the width of the bandage, over the left shoulder, diagonally downward across the back to the outer border of the right breast. Carry the roller horizon-

Fig. 64.—Suspensory bandage of both breasts—first descending oblique turn.

tally across the front of the chest, making a space equal to one-half the width of the bandage until the outer border of the left breast is reached; then diagonally upward over the back of the chest, over the right shoulder, and diagonally downward over the left breast, lifting the latter with the hand before placing the turn beneath it. Continue these turns as described until the breasts are covered.

FIGURE-OF-8 OF THE BREASTS. (Method of Kiwisch, Fig. 65.)

Uses.—To support and firmly compress both breasts.

Roller $2\frac{1}{2}$ or 3 inches wide.

The operator and patient should face each other.

Make a complete turn of the bandage of both breasts (page 86). Carry the roller across the lower borders of the

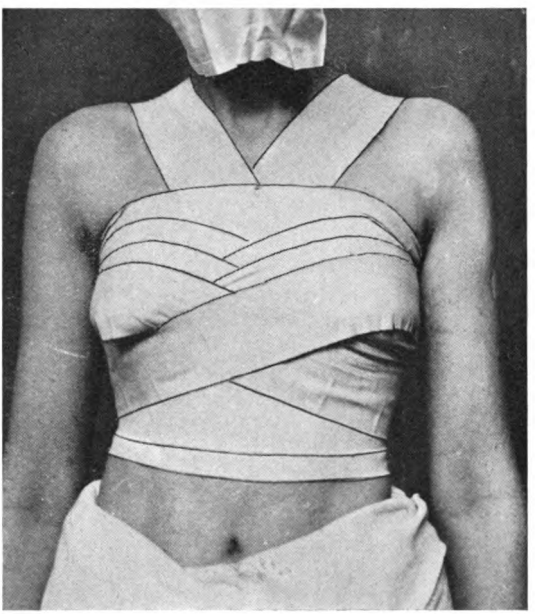

Fig. 65.—Figure-of-8 of the breasts—method of Kiwisch.

breasts, slightly obliquely upward across the back, and across the upper border of both breasts. Repeat these turns once, making a space equal to one-half the width of the bandage (Fig. 66). After reaching the outer border of the right breast the third time, carry the bandage under the breast, diagonally across the sternum, over the left breast, around the back of the chest, over the upper border of the right

breast, diagonally downward across the sternum, and under the left breast. This completes one figure-of-8 turn. Make two or three similar turns, with spaces equal to about one-

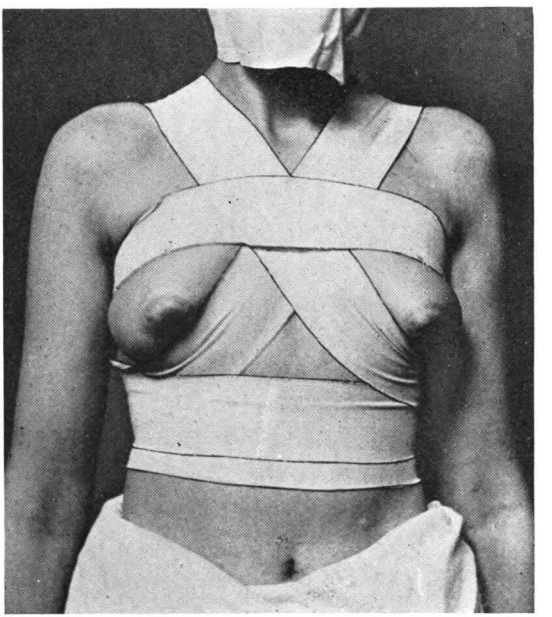

Fig. 66.—Figure-of-8 of the breasts—first step

third the width of the bandage, and complete the bandage by a circular turn directly over the nipples.

DESAULT'S BANDAGE. (Fig. 67.)

Uses.—For fracture of the clavicle.

Roller 3 inches wide.

The operator and patient should face each other.

This bandage as described by Desault consisted of three distinct parts: First, a slow ascending spiral of the chest to

hold a wedge-shaped pad under the arm, with two or more figure-of-8 turns around the sound shoulder; second, a slow descending spiral of the arm and chest to hold the arm against the pad and thus force the head of the humerus outward; third, an anterior and posterior axilla-shoulder-elbow turn to draw the shoulder upward and backward. The first roller

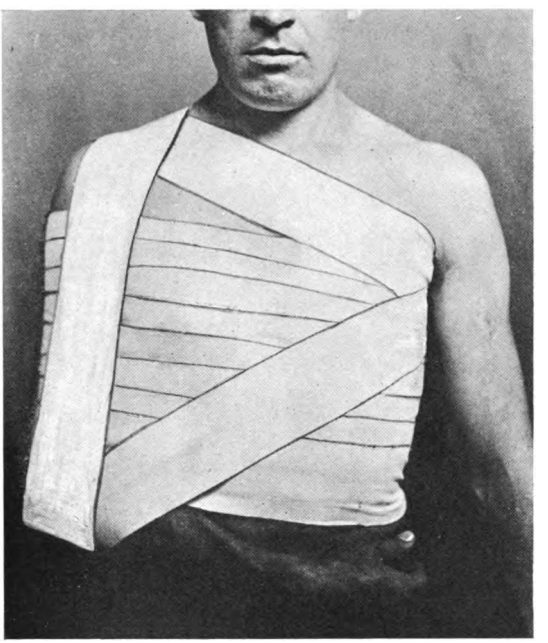

Fig. 67.—Desault's bandage.

is unnecessary, as the second secures the arm to the side of the chest and thus holds the pad in place.

Place a wedge-shaped pad under the arm of the injured side with the thickest portion well up in the axilla. Bring the arm against the pad, with the forearm flexed at a right angle.

Place the initial extremity in the axilla of the sound side and carry the roller across the back and upper part of the arm, across the front of the chest to the sound axilla, where the initial extremity is secured. Make slow descending spiral turns (page 34), with spaces equal to one-third the width of the bandage, until the entire arm is covered and secured firmly

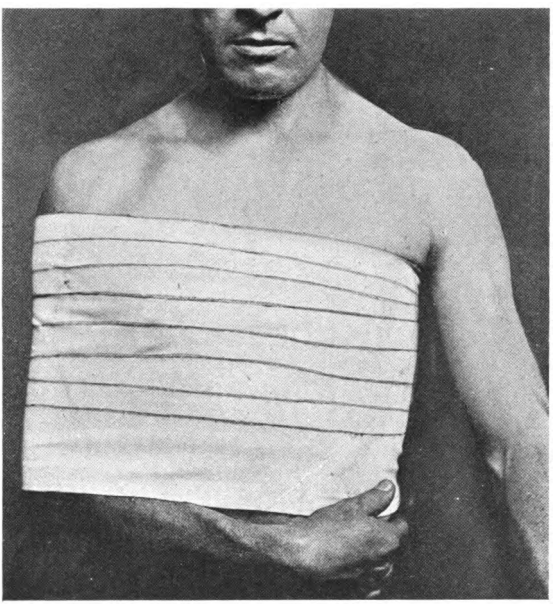

Fig. 68.—Second roller of Desault.

against the pad. Fasten the end with a strip of adhesive plaster or a safety-pin (Fig. 68).

Place the initial extremity of the second roller in the axilla of the sound side and carry the roller obliquely across the back to the top of the shoulder of the injured side, downward in front of the arm, under the elbow and obliquely upward across the back to the axilla of the sound side. Carry the

roller under the axilla, obliquely upward across the front of the chest to the top of the shoulder of the injured side, downward behind the arm, under the elbow, and obliquely upward across the chest to the axilla of the sound side. Repeat these turns twice.

It will be seen that two triangles are formed by this roller, one on the back and one on the front of the chest, the base

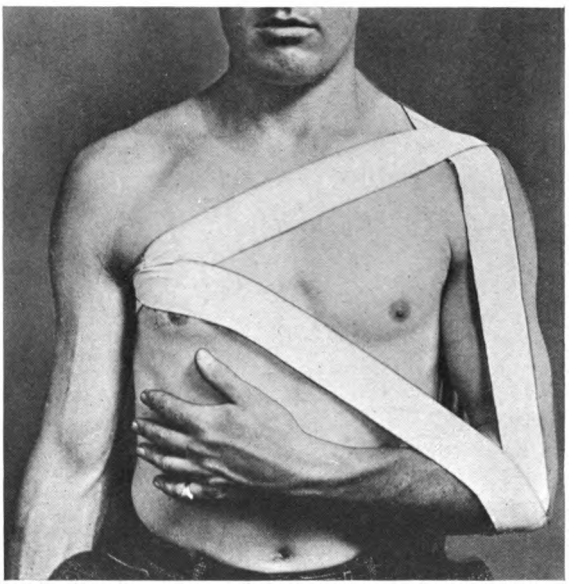

Fig. 69.—Third roller of Desault—the A-S-E bandage.

resting on the arm of the injured side and the apex in the axilla of the sound side. The turns which form these triangles are always made in the same order, the angles being located at the axilla, shoulder, elbow, and these points being covered in that rotation, thus giving rise to the common name for the third roller of Desault—the A-S-E bandage (Fig. 69).

VELPEAU'S BANDAGE. (Fig. 70.)

Uses.—For fracture of the clavicle; after reduction of a dislocated humerus.

The Velpeau position is obtained by placing the hand of the affected side on the opposite shoulder. This carries the

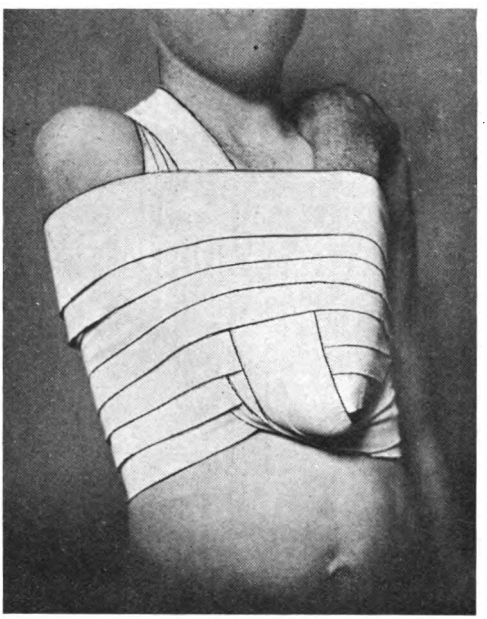

Fig. 70.—Velpeau's bandage.

elbow of the affected side near the median line of the body and pushes the shoulder upward, backward, and outward.

Bandage $2\frac{1}{2}$ or 3 inches wide.

The operator and patient should face each other.

Place the arm of the affected side in the Velpeau position. Hold the initial extremity in the axilla of the sound side and carry the roller diagonally across the back to the top of the

shoulder of the injured side; downward, crossing the arm at the level of the insertion of the deltoid (Fig. 71); then under the arm and diagonally across the front of the chest to the point of starting. Repeat this turn, exactly overlapping it, until the roller has passed under the arm. Then carry it horizontally around the chest and across the flexed elbow, the middle of the

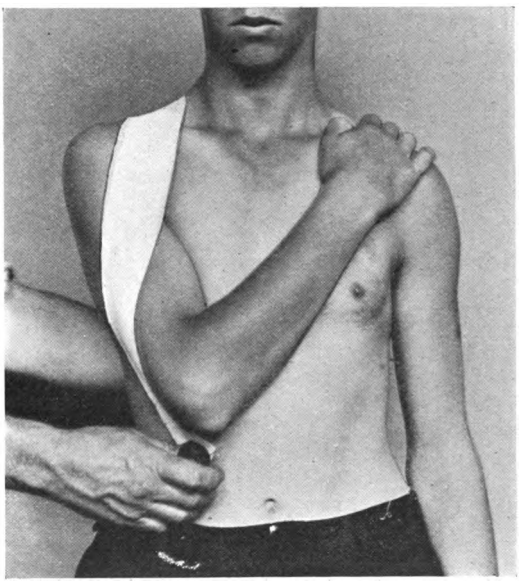

Fig. 71.—Velpeau's bandage—first vertical turn.

bandage resting on the condyle of the humerus, the tip of the olecranon being exposed (Fig. 72). Carry the roller to the axilla of the uninjured side, diagonally across the back to the shoulder of the injured side, following the course of the first turn, but overlapping it two-thirds toward the median line of the body, pass downward and under the arm and horizontally around the chest, following the course of the last circu-

lar turn, but overlapping it one-third. Continue these turns, alternating the shoulder and circular turns until the former reach the tip of the elbow. Then continue with slow ascending spiral turns (page 34), keeping the spaces even, until the arm and forearm have been covered. Strips of

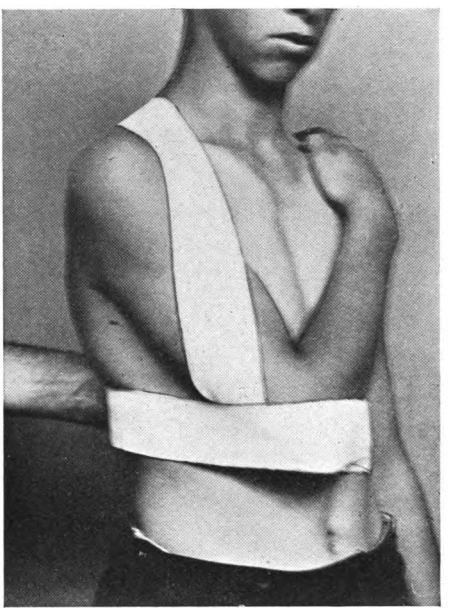

Fig. 72.—Velpeau's bandage—first horizontal layer.

adhesive may be placed at right angles to the various turns to make them more secure.

DAVIS BANDAGE TO CONFINE THE ARM TO THE SIDE. (Fig. 73.)

Uses.—To confine the arm to the side.

Roller $2\frac{1}{2}$ or 3 inches wide.

The operator and patient should face each other.

Dr. G. G. Davis describes this bandage as follows: "Fix the initial extremity by a couple of turns around the chest and arm just above the elbow. Then bring the roller under the forearm obliquely up over the elbow, across the back, down

Fig. 73.—Bandage for confining the arm to the side. (Davis, Principles of Bandaging).

over the elbow again, around the back and up over the forearm, in front of and parallel with turn one; thence across the back and down over the forearm near the hand, thence around the back and across the front of the chest and arm, there ending the bandage."

CROSSED BANDAGE OF THE PERINEUM. (Fig. 74.)

Uses.—To retain dressings on the perineum. It is rather difficult to apply properly, is rather uncomfortable for the patient, and is not more efficient than the simple **T**-bandage (page 122).

Roller $2\frac{1}{2}$ or 3 inches wide.

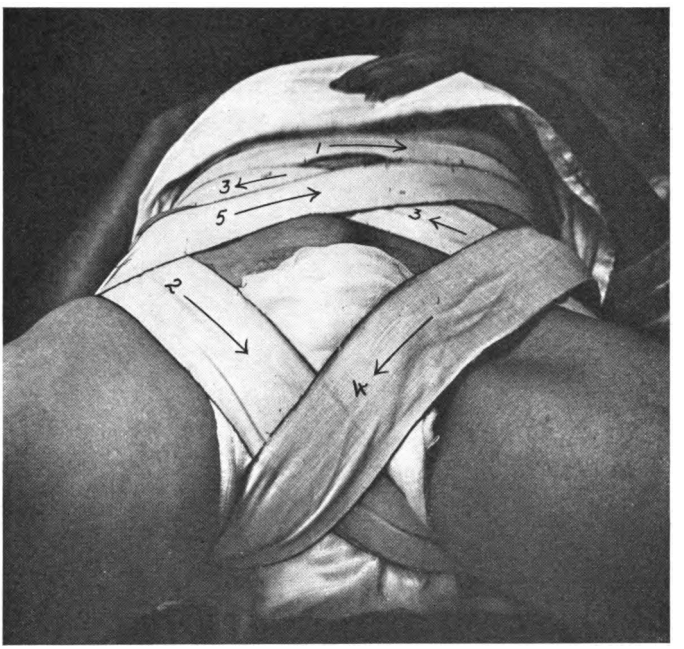

Fig. 74.—Crossed bandage of perineum—one complete turn has been made.

The operator should stand on the right side of the recumbent patient, whose thighs should be separated and pelvis elevated.

Place the initial extremity near the center of the back of the pelvis just below the level of the iliac crests, and carry the roller, just beneath the iliac crests, over the abdomen and

around the pelvis, covering and fixing the initial extremity. As the roller ascends around the right side of the pelvis, carry it diagonally downward parallel with the right groin, diagonally backward across the perineum, back of the left thigh, and forward over the great trochanter. Carry the roller across the left groin and over the lower abdomen to the right side of the pelvis; then around the back of the pelvis to the left side, diagonally downward parallel with the left groin, diagonally backward across the perineum, back of the right thigh, forward over the great trochanter, and across the lower abdomen to the left side of the pelvis. This completes one full cross of the perineum; as many similar turns as are necessary may be made.

(Davis starts his crossed bandage of the perineum with a circular turn around the left thigh, high up; Eliason starts from the middle of the abdomen and circles the left thigh, crosses the perineum and then goes around the pelvis and across the abdomen, this last turn fixing the initial extremity.)

BANDAGES OF THE LOWER EXTREMITY

SPICA OF THE FOOT. (Figs. 75 and 76.)

Uses.—To hold dressings on any part of the foot, or to give support to the foot.

Roller 2 inches wide.

The leg, with the foot at right angles to the long axis of the leg, should be extended toward the operator.

The bandage consists of a series of ascending figure-of-8 turns (page 39), one loop being around the foot and the other around the heel and ankle, with the crosses presenting in the median line of the dorsum of the foot in the form of a spica (Fig. 76). The spica of the foot is the only bandage of the foot or leg that should start around the foot; the only one

that does not start around the ankle. It may be used as a preliminary to any of the leg bandages.

Fasten the initial extremity by a circular turn (page 30) around the ball of the toes, carrying the roller clockwise. From the right side of the foot carry the roller diagonally across the back of the foot and backward along the left side of the foot and around the heel, the lower edge of the bandage being placed on a level with the sole of the heel. Carry

Fig. 75.—Spica of the foot—lateral view.

the roller forward along the right side of the foot, and diagonally across the dorsum of the foot, crossing the first diagonal turn in the median line. This completes the figure-of-8, one loop being around the foot, the other around the heel, and the cross on the back of the foot. Continue these figure-of-8 turns, making even spaces (page 26), which are continuously of the same width around the foot and around the heel and ankle, until all but about 1 inch of the under surface of the heel has been covered. Complete the bandage by a circular

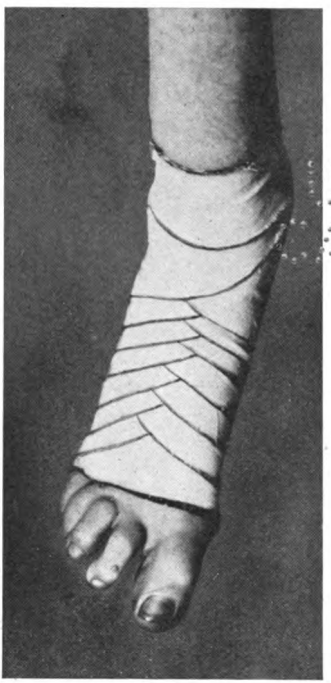

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Fig. 76.—Spica of the foot—the anterior spica.

Fig. 77.—Spica of the foot, showing tendency to slide upward on the tendo Achillis.

turn around the ankle, or, if the leg is to be bandaged, continue up the leg with slow ascending spiral turns.

It will be noted that the turns around the heel and ankle have a tendency to slide upward on the tendo Achillis (Fig. 77). This may be overcome by placing a small pad over the tendon. Undue pressure on the malleoli may be prevented by placing a small pad beneath them.

SPIRAL OF THE HEEL, OR THE AMERICAN HEEL. (Fig. 78.)

Uses.—To retain dressings on the ankle; to make uniform pressure upon the ankle-joint; as a preliminary to bandages of the leg.

Roller $2\frac{1}{2}$ inches wide.

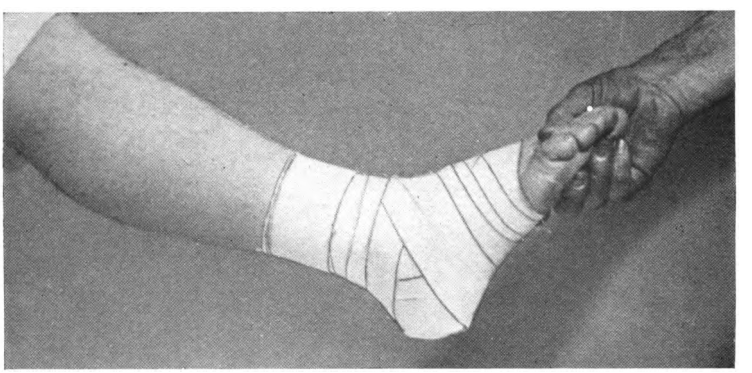

Fig. 78.—Spiral of the heel.

The leg should be extended toward the operator with the foot at a right angle to the long axis of the leg.

Fasten the initial extremity by a circular or oblique turn (page 28) around the ankle. From the right side of the ankle carry the roller diagonally downward and forward across the dorsum of the foot to the ball of the toes, and make a circular turn (page 30) around the foot. As the bandage as-

cends in circling the foot, allow it to take its natural course (page 24) so that the bandage will lie perfectly flat with both edges exerting even pressure. This will throw the bandage off the desired course, and to return it to the proper direction a reverse must be made (page 35). Make spiral reverse turns, an even number if possible, until the top of the instep is reached. Carry the roller over the point of the heel, making the middle of the bandage rest directly over the point

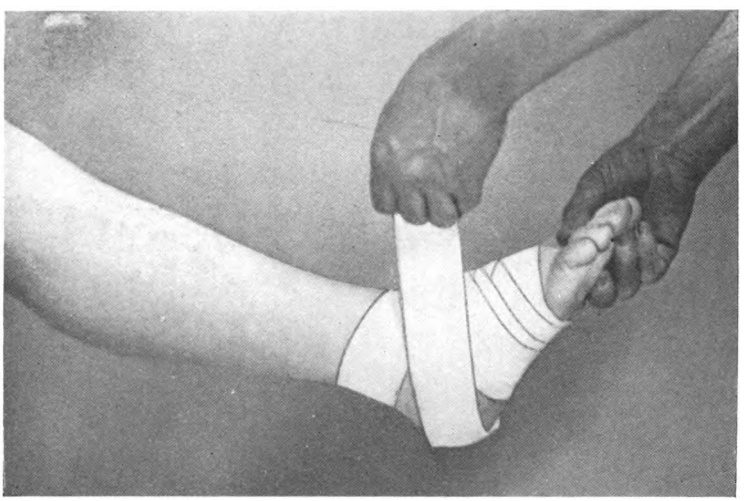

Fig. 79.—Spiral of the heel—circular turn over the point of the heel.

of the heel, and back to the top of the instep (Fig. 79). Then carry it downward and backward on the left side of the ankle, behind the tendo Achillis, forward across the right side of the heel between the malleolus and the sole of the foot, under the sole of the foot, and upward on the left side of the ankle to the top of the instep. It will be noted that the roller descended and ascended on the same side of the ankle. Then carry the roller downward and backward on the right side of

the ankle, behind the tendo Achillis, forward across the left side of the heel between the malleolus and the sole, under the sole of the foot, and upward on the right side of the ankle to the top of the instep. The roller again descended and ascended on the same side of the ankle. These two turns form two loops around the heel which may be displaced easily by pulling on their lower edge. To secure the loops, a circular turn may be made around the instep and heel or a safety-pin may be placed in either loop. The bandage is completed by a turn around the ankle.

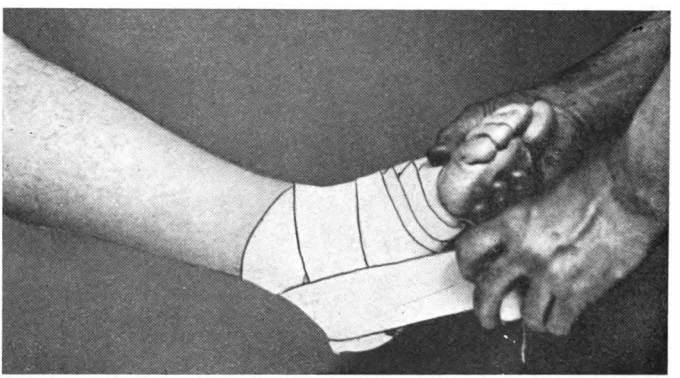

Fig. 80.—Spiral of the heel—circling the side of the heel and making a loop.

The "loop turns" are usually made by carrying the roller from the top of the instep to the sole of the foot before passing transversely over the side of the heel (Davis, Wharton, Hopkins, Eliason). The natural course of the bandage (page 24) would carry it behind the tendo Achillis rather than under the sole of the foot. On returning to the top of the instep from the sole of the foot the second time, the natural course of the bandage would carry the roller onto the leg, where the spiral of the heel is to be completed or where a bandage of the leg is to be started.

BANDAGES OF THE LEG

The beginner in bandaging experiences considerable difficulty in applying a bandage to the leg that will give an even amount of pressure throughout and remain in place on an ambulatory patient. Experience with the several bandages will result, usually, in the selection by the individual operator of one of them as the bandage most readily and more nearly perfectly applied by him. Practice will make one letter perfect in the application of any bandage, but those of the leg require more practice than many others.

All bandages of the leg should begin at the ankle and cover in part of the foot to prevent edema of the dorsum of the foot. The only exception to this rule is found in a bandage of the leg that begins with a spica of the foot (page 99).

Uses.—To hold a dressing on any part of the leg; to retain splints; to retain extension apparatus; to afford support. When support is the essential requirement of the bandage, especially in varicose conditions of the leg, the limb should be elevated for the purpose of emptying the veins before the bandage is applied and the bandage should be completed while the limb is in the elevated position.

SPIRAL REVERSE OF THE LOWER EXTREMITY. (Fig. 81.)

Roller $2\frac{1}{2}$ inches wide.

The leg should be extended toward the operator, with the foot at a right angle to the long axis of the leg.

Fasten the initial extremity by a circular or oblique turn (page 28) around the ankle, passing the roller clockwise. From the right side of the ankle carry the roller diagonally forward and downward across the dorsum of the foot and make a circular turn around the foot. Carry the roller diagonally upward and backward across the dorsum, crossing the first diagonal turn in the median line. Carry the roller

around the ankle and begin covering the leg with slow ascending spiral turns (page 34), making the spaces (page 26) equal about one-third the width of the bandage. As soon as the slow ascending spiral turns begin to gap (page 24) allow the bandage as it ascends in circling the leg to take its natural course (page 24), so that the bandage will lie perfectly flat with both edges exerting even pressure. This will throw the

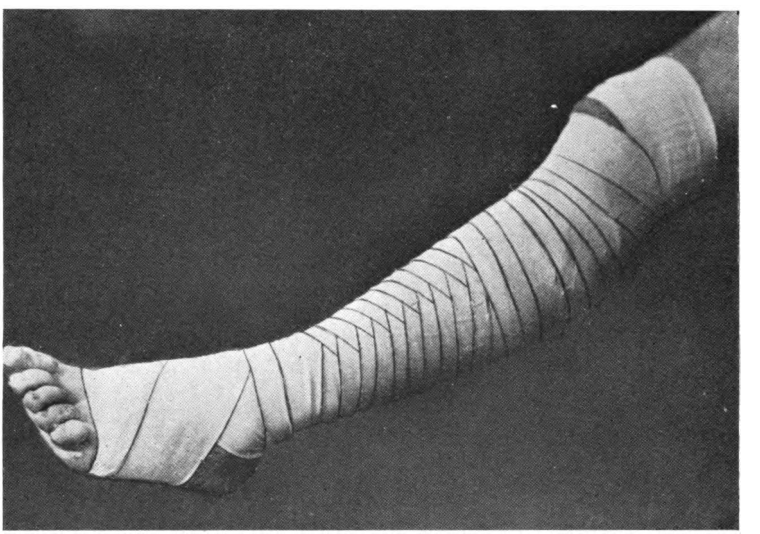

Fig. 81.—Spiral reverse of the lower extremity—first turn when the knee is to be covered.

bandage off the desired course and it will be necessary to make a reverse (page 35) to return the roller to the desired course. Unroll the bandage for a distance equal to twice the width of the roller (see Fig. 22). Hold the lower edge of the last turn with the thumb of the left hand and allow the unwound portion of the bandage to become slack. Pronate the right hand, which holds the roller, and carry the roller

toward the median line of the leg and downward parallel with the long axis of the leg until it is slightly below the left thumb (see Fig. 23). Carry the roller to the right, laying the upper border of the bandage, which now becomes lowermost, in such a position that the space made will equal the spaces already made, and the crosses will lie over a fleshy portion of the leg and not over the subcutaneous portion of the tibia (see Fig. 24). Carry the roller toward the back of the leg, move the left hand toward the back of the leg. Pass the roller from the right to the left hand and pull with the left just enough to make the reversed turn lie snug against the limb. Carry the roller to the front of the leg, allowing it to lie perfectly flat against the limb, and pass the roller to the right hand. Hold the lowermost edge of the bandage where it crosses the preceding turn with the thumb of the left hand and continue as above. Continue spiral reverse turns (page 38) until the cylindric portion of the leg is reached, when slow ascending spiral turns will lie flat. Continue with slow ascending spiral turns until the leg is entirely covered.

The completed bandage should show a line of crosses in a straight line, parallel with the long axis of the leg, and lying over the fleshy portion of the leg and not over the crest of the tibia. The best position is to the outer side of the tibia, over the anterior tibial muscle. The spaces made must be even and regular or the line of crosses will deviate from the straight line toward the wider space.

FIGURE-OF-8 OF THE LEG. (Fig. 82.)

Start the bandage and continue its application as described under the spiral reverse of the lower extremity (page 105) until the slow ascending spiral turns begin to gap. Allow the bandage as it ascends in circling the leg to take its natural course (page 24), so that it will lie perfectly flat with the

edges exerting an even pressure. Begin figure-of-8 turns (page 39) by carrying the roller diagonally upward and around the leg and diagonally downward, crossing the ascending diagonal turn to the outer side of the crest of the tibia. Circle the leg and thus complete the first figure-of-8. It will

Fig. 82.—Figure-of-8 of the leg.

be noted that a space separates the two loops on the back of the leg and that the lower edge of the upper loop gaps (Fig. 83). Make successive figure-of-8 turns, each one covering one-half of the preceding turn, until the greatest diameter of the leg is reached. Complete the bandage by one or two circular turns.

The completed bandage presents a fine appearance, is secure, and is very frequently used, although it requires a greater length of bandage than the spiral reverse. It is not a perfect bandage (page 24) because the turns are not "so

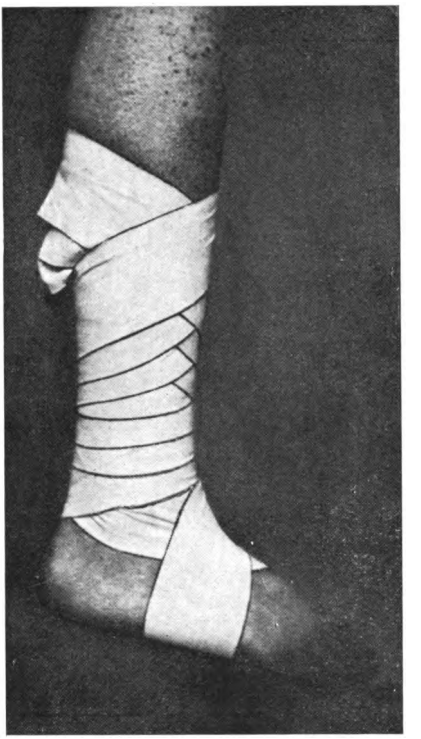

Fig. 83.—Figure-of-8 of the leg—gapping of the lower border of the upper loop.

placed that the pressure throughout is even and sufficient" and because turns are required to cover underlying defects. The loose edges of the upper loops of the figure-of-8 turns become rumpled upon themselves as they are covered by the succeeding flat turns. This causes uneven pressure on the

underlying structures, a defect which should be avoided whenever possible.

MODIFIED FIGURE-OF-8 BANDAGE OF THE LEG. (Fig. 84.)

Start the bandage and continue its application as described under the spiral reverse of the lower extremity (page 105)

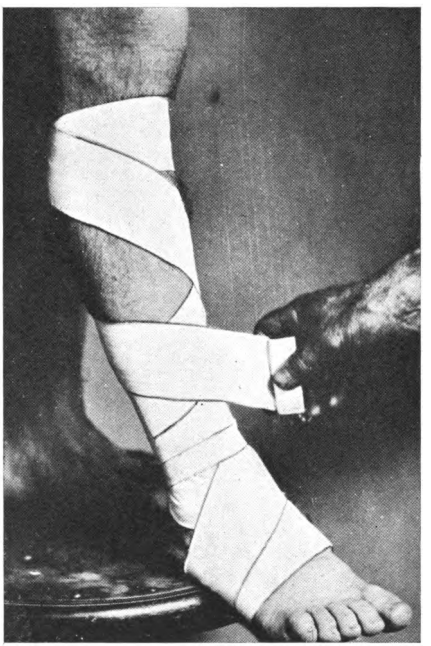

Fig. 84.—Modified figure-of-8 of the leg—the first rapid ascending spiral, circular, and rapid descending spiral turns have been made.

until the slow ascending spiral turns begin to gap. Allow the bandage as it ascends in circling the leg to take its natural course (page 24), so that it will lie perfectly flat with the edges exerting even pressure. Carry the roller upward with a rapid ascending spiral turn (page 32) beyond the greatest

diameter of the leg and make a loose circular turn above the calf. Carry the roller downward with a rapid descending spiral turn (page 32), crossing the first portion of the rapid ascending spiral turn to the outer side of the crest of the tibia. Circle the leg with a firm turn and repeat the rapid ascending spiral, loose circular, and rapid descending spiral turns until the leg is entirely covered. The turns that circles the leg below must be made firm, while the turns above the calf must be loose. If the latter are made firm there will be marked interference with the circulation, as every added turn will increase the pressure on the underlying structures. If properly applied, this bandage will remain in place and will be comfortable. It requires almost twice as much bandage as the spiral reverse.

MODIFIED SPIRAL REVERSE BANDAGE OF THE LEG. (Fig. 85.)

Start the bandage and continue its application as described under the spiral reverse of the lower extremity (page 105) until the slow ascending spiral turns begin to gap. Allow the bandage as it ascends in circling the leg to take its natural course, so that it will lie perfectly flat with the edges exerting even pressure. As the roller ascends in circling the leg the second time, make a reverse and slide it downward until the bandage lies in the desired position. Make a firm circle around the leg, with a space equal to about one-half the width of the bandage, and proceed as before, making a reverse every second turn around the leg. Repeat these turns until the greatest diameter of the leg is reached and complete the bandage with two or three slow ascending spiral turns.

If the knee is to be covered after bandaging the leg, continue the slow ascending spiral turns until the upper edge of the bandage touches the lower edge of the patella. Then carry the roller directly over the patella (see Fig. 81), around

the popliteal space, over the lower half of the patella, around the popliteal space, and finally over the upper half of the

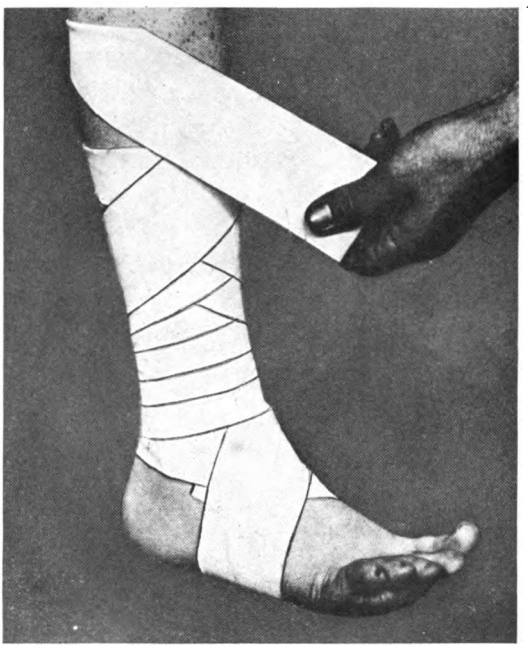

Fig. 85.—Modified spiral reverse of the leg—sliding of the reverse into place.

patella. Continue as far up the thigh as is necessary with spiral reversed turns.

FIGURE-OF-8 OF THE KNEE. (Fig. 86.)

Uses.—To retain splints or dressings to the knee when the knee is flexed.

Roller 2 inches wide.

The operator should face the anterior aspect of the flexed knee.

Place the initial extremity over the center of the patella and carry the roller clockwise around the knee, covering and fixing the initial extremity. Carry the roller around the

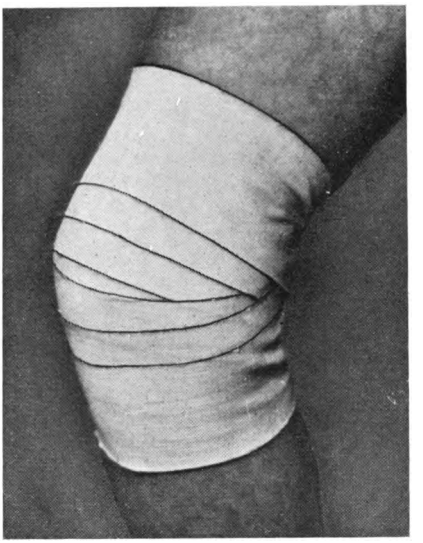

Fig. 86.—Figure-of-8 of the knee.

knee and as it ascends make a space equal to one-half the width of the bandage. Again circle the knee and cover in the portion of the circular turn not covered by the preceding turn. Make figure-of-8 turns (page 39), with one loop ascending on the thigh and the other descending on the leg with the crosses in the popliteal space, until three or four figures-of-8 have been made.

SPIRAL REVERSE OF THE THIGH. (Fig. 87.)

Uses.—To hold dressings or splints on the thigh.
Roller 3 inches wide.

If the patient is ambulatory, he should stand facing the operator, who may kneel or sit in front of the patient. When the patient is bed-ridden, the operator should stand on the outer side of the thigh to be bandaged.

Fasten the initial extremity by a circular turn (page 30) around the thigh just above the condyles. Carry the roller,

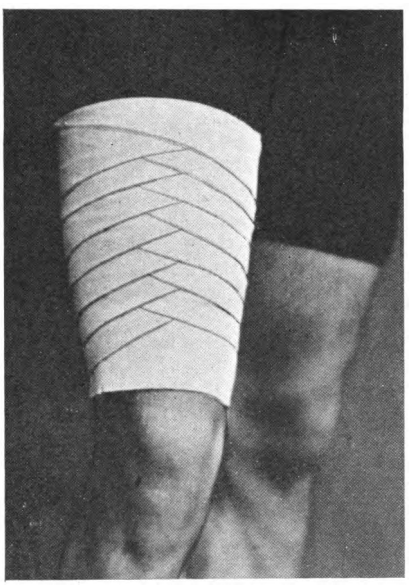

Fig. 87.—Spiral reverse of the thigh.

clockwise, around the thigh in slow ascending spiral turns (page 34). As soon as the bandage begins to gap, allow it to take its natural course as it ascends in circling the thigh. Make a reverse (page 35) and continue with spiral reversed turns (page 38) until the thigh is covered, placing the crosses on the anterior aspect of the thigh.

SPICA OF THE GROIN. (Fig. 88.)

Uses.—To retain dressings on the groin; to complete bandages of the thigh. One spica turn around the thigh is very useful in preventing an abdominal bandage from sliding upward and exposing the lower part of the abdomen.

Roller 3 inches wide.

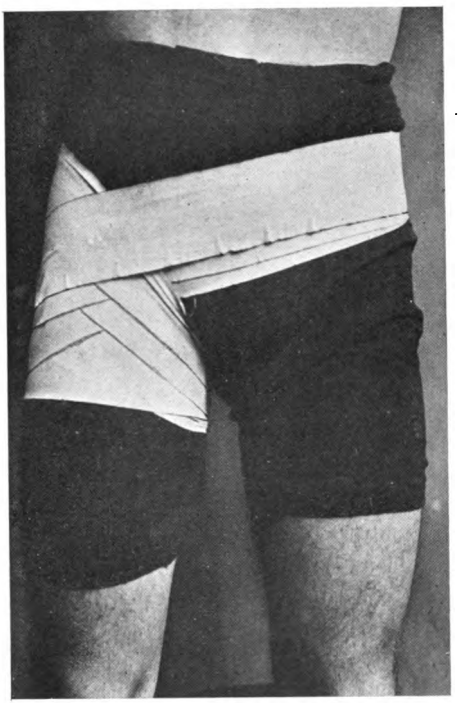

Fig. 88.—Spica of the groin.

If the patient is ambulatory, he should stand facing the operator, who may kneel or sit in front of the patient. When the patient is bed-ridden, the pelvis should be raised from the bed and should rest on a small basin or a special back-

rest, unless such elevation is contra-indicated, as in some fractures of the femur. It is possible to pass the roller beneath the back of the recumbent patient, but this procedure, at times, is disturbing to the patient.

Fasten the initial extremity by a circular turn around the thigh, near the crotch, passing the roller clockwise. When the dressing does not extend very far onto the thigh, the initial extremity may be fastened by laying it diagonally from above downward and from right to left, carrying the roller around the thigh and fixing the extremity as the roller passes diagonally upward toward the iliac crest.

Begin figure-of-8 turns (page 39) by carrying the roller diagonally upward to the space between the crest of the ilium and the great trochanter of the femur, across the back to a corresponding point on the opposite side, and then diagonally downward to the thigh, crossing the ascending diagonal turn in the median line of the groin, and in such a position that there will not be a vacant space between the circular and figure-of-8 turns. Carry the roller around the thigh, thus completing a figure-of-8 turn, and diagonally upward, making a space on the front of the thigh equal to one-third the width of the bandage. This space gradually decreases until the side of the body is reached, where the bandage should cover the preceding turn and should continue in this relative position until the opposite side is reached, from which point the space gradually increases until it equals one-third the width of the bandage as it crosses the upward diagonal turn on the front of the thigh. Continue these spica turns (page 39) until the groin has been covered.

DOUBLE SPICA OF THE GROIN. (Figs. 89–91.)

Uses.—Same as single spica.

Roller 3 inches wide.

If the patient is ambulatory, he should stand facing the operator, who may kneel or sit in front of the patient. When the patient is bed-ridden, the pelvis should be raised from the bed and should rest on a small inverted basin or on a special back-rest, unless such elevation is contra-indicated, as in some fractures of the femur. It is possible to pass the

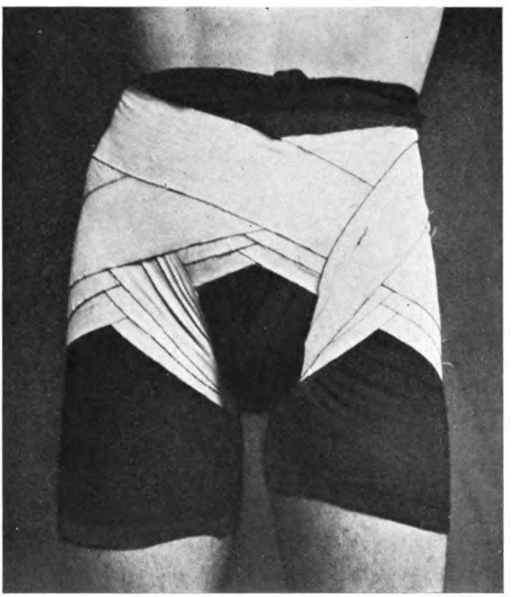

Fig. 89.—Double spica of the groin.

roller beneath the back of the recumbent patient, but this procedure, at times, is disturbing to the patient.

Fasten the initial extremity by a circular turn around the right thigh, close to the crotch, passing the roller clockwise. When the dressing does not extend very far onto the thigh, the initial extremity may be fastened by laying it diagonally across the front of the right thigh, near the crease of the

groin, from above downward and from the operator's left to right, carrying the roller around the thigh, and fixing the extremity as the roller passes diagonally upward toward the opposite iliac crest.

Begin figure-of-8 turns by carrying the roller diagonally upward to the space between the crest of the ilium and the great trochanter of the femur, across the back to a correspond-

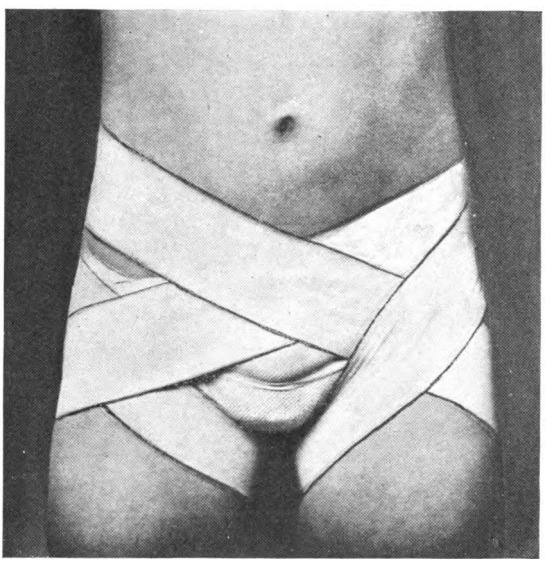

Fig. 90.—Double spica of the groin—one complete turn has been made.

ing space on the opposite side. Carry the roller diagonally downward across the lower part of the abdomen, crossing the first diagonal turn directly in the median line of the body, to the upper, anterior surface of the left thigh (Fig. 91). Make a circular turn around the thigh, as near the crotch as possible, and then diagonally upward and outward to the space between the iliac crest and the trochanter. Carry the roller

across the back, exactly overlapping the preceding turn, to the space between the right iliac crest and great trochanter, and diagonally downward over the right groin, crossing the original diagonal turn exactly in the median line of the anterior aspect of the thigh. Carry the bandage around the

Fig. 91.—Double spica of the groin—making the first downward oblique turn across the abdomen and left thigh.

thigh, and as it is brought forward around the outer aspect of the thigh start a space which equals about one-third the width of the bandage and gradually decreases until it reaches the left side of the pelvis, where the roller overlaps the preceding turn. Carry the roller across the back, overlapping the preceding back turns to the right side of the pelvis.

Follow the course of the preceding turn diagonally toward the left thigh, making a space which begins below the crest of the ilium and increases gradually until the outer aspect of the left thigh is reached, where it equals one-third the width of the bandage. Carry the roller around the thigh and upward and outward to the left side of the pelvis, making a space which equals one-third the width of the bandage and gradually decreases until the roller reaches the side of the pelvis, where the turn overlaps the preceding one. Continue the figure-of-8 turns around the two groins alternately until they have been covered.

PART II

THE TAILED BANDAGES

As their names imply, these bandages are characterized by the presence of varying numbers of ends or tails. Each

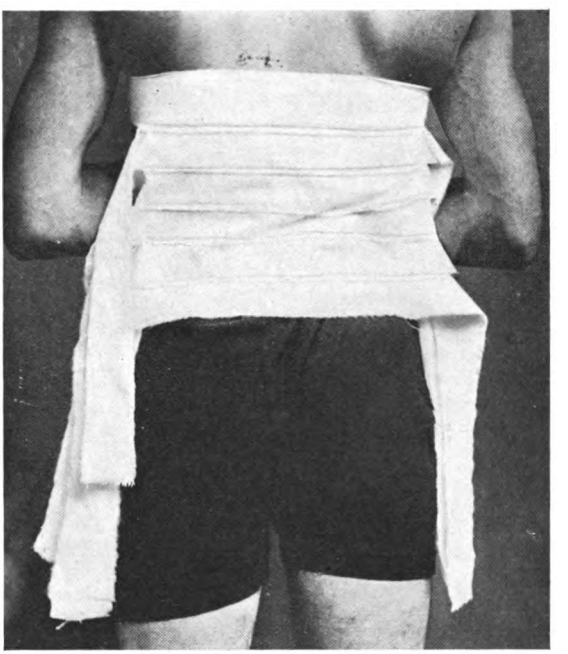

Fig. 92.—The bandage of Scultetus.

tailed bandage consists of a body and three or more ends, and is given a distinctive name in accordance with the number

of tails or the relative position of the parts composing it. Strips of material fastened at right angles to each other form the T-bandage, two strips so placed forming a single T, two strips placed vertically on a single horizontal one forming a double T. A number of strips fastened parallel with each other and slightly overlapping, shingle-fashioned, to make a body with free ends on either side, form the bandage of Scultetus (Fig. 92). A piece of material torn toward the center to make three or more tails on either end is known as a *many-tailed bandage.* When only two are made on either end a *four-tailed bandage* results. The length and width of the body and tails vary with the purposes of the bandage.

Numerous applications of the tailed bandages have been described. Very few of them are used in modern bandaging, although the single T-bandage surpasses all others for holding a dressing on the perineum, and the Scultetus, or the many-tailed bandage, when properly applied, is very efficient in retaining a dressing, with or without pressure, on the abdomen.

The description of a few of the tailed bandages will give an idea of their general usefulness; the ingenuity of the operator can make them applicable to almost any portion of the body.

THE SINGLE T-BANDAGE. (Figs. 93, 94.)

Uses.—To retain a dressing on the perineum, anal region, or vulva.

Take a piece of muslin or flannellet, $2\frac{1}{2}$ or 3 inches wide and one and one-half times as long as the circumference of the body above the pelvic brim, and fasten at right angles to it, midway between the two ends, a second piece long enough to reach from the lumbar region, between the thighs, to the

umbilicus. If a needle and thread are not obtainable, make two slits as long as the horizontal strip is wide, lengthwise, near the end of the vertical strip, and weave the horizontal one through them.

Place the body of the bandage on the back, just above the level of the pelvic brim, pass the ends of the horizontal strip

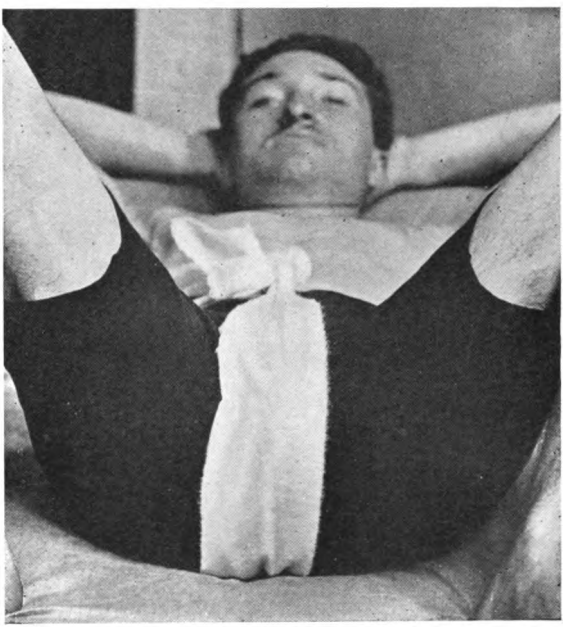

Fig. 93.—The T-bandage.

around the body and tie or pin the ends on the abdomen. Carry the vertical strip downward along the spine, between the thighs and upward onto the abdomen; fasten the end to the horizontal strip, exerting enough pressure on the bandage to hold the dressing in place.

When the T-bandage is used to hold a dressing on the male

perineum or anal region, the vertical arm should be split for about two-thirds of its length, brought forward on either

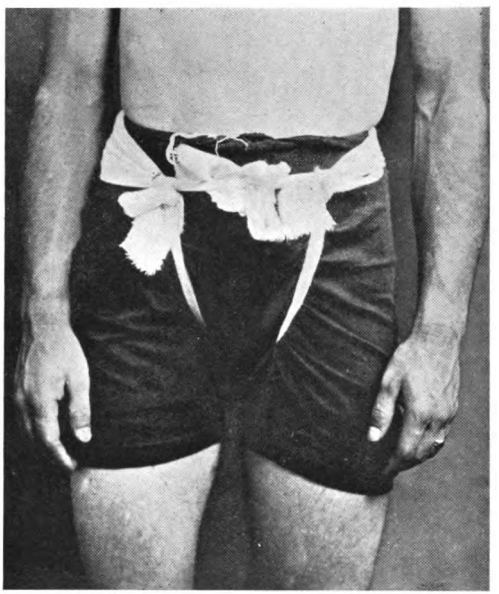

Fig. 94.—The T-bandage.

side of the scrotum, and fastened to the horizontal arm (Fig. 94).

DOUBLE T-BANDAGE. (Fig. 95.)

Uses.—To hold a dressing on the chest.

Take a piece of muslin or flannellet 8 or 10 inches wide and one and one-half times as long as the circumference of the chest. Fasten the ends of two strips about 2 inches wide and 20 inches long to either side of the center of the wide strip. Place the body of the bandage over the back of the chest, carry the ends of the wide strip around the chest and fasten

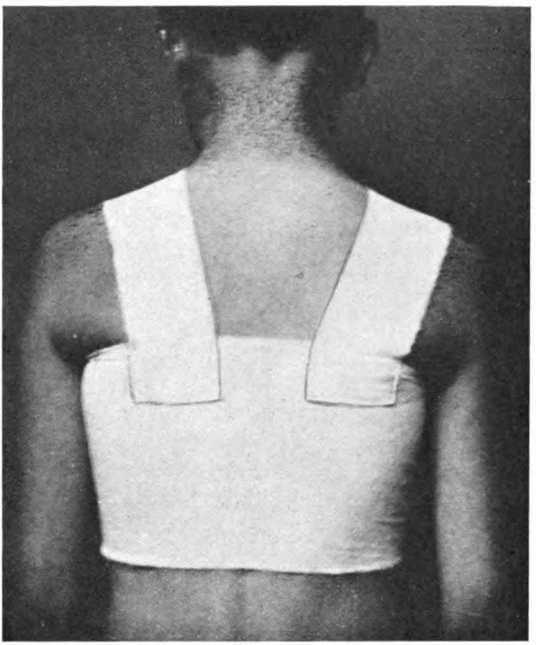

Fig. 95.—The double T-bandage.

them in front. Carry the two narrow strips over either shoulder and fasten them to the wide strip with safety-pins.

FOUR-TAILED BANDAGE OF THE SCALP. (Figs. 96, 97.)

Uses.—To hold a dressing on the scalp.

Take a piece of muslin or flannellet 6 or 8 inches wide and about 30 inches long. Split either end into two tails of equal width to within 4 inches of the center.

Place the body of the bandage on the scalp, with two tails anterior and two posterior. Tie the two posterior tails under the chin when the middle or anterior portion of the scalp is covered (Fig. 97), or around the forehead when the posterior part is covered, and the two anterior tails around

Fig. 96.—Four-tailed bandage of the scalp.

Fig. 97.—Four-tailed bandage of the scalp.

the occiput in the first two instances and under the chin in the last.

The four-tailed bandage, of proper length and width, may be used to hold a dressing on the chin, on the nape of the neck, etc.

THE MANY-TAILED BANDAGE OF THE ABDOMEN. (Fig. 98.)

Uses.—To retain dressings on the abdomen.

Take a strip of muslin or flannellet 8 or 10 inches wide and long enough to circle the abdomen one and one-half times.

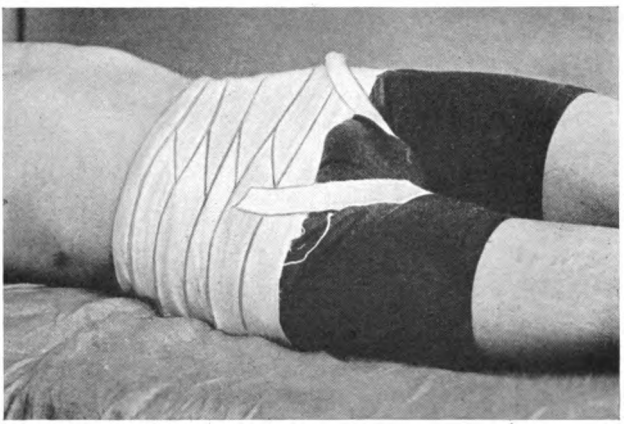

Fig. 98.—Many-tailed bandage of the abdomen.

Split either end into four tails of even width to within 5 inches of the center.

Place the body of the bandage under the recumbent patient, with the tails emerging from either side, the lowermost being below the level of the iliac crests. Beginning with the uppermost tail on either side, overlap them alternately across the abdomen, carrying the ends slightly downward, so that they will be held in place by the succeeding tails. Secure the

lowermost tails by safety-pins and place safety-pins at various intersections of the tails to make them less easily displaced.

This tailed bandage of the abdomen has a tendency to "ride" upward. This may be overcome by splitting the lowermost tail into two on either side and bringing the final tails forward between the thighs and fastening them with safety-pins to the overlapped tails.

An abdominal binder made of heavy muslin, wide enough to extend from the level of the trochanters to the lower ribs and long enough to pass around the body with overlapping, may be used instead of the tailed bandage. The bandage of Scultetus is similarly used.

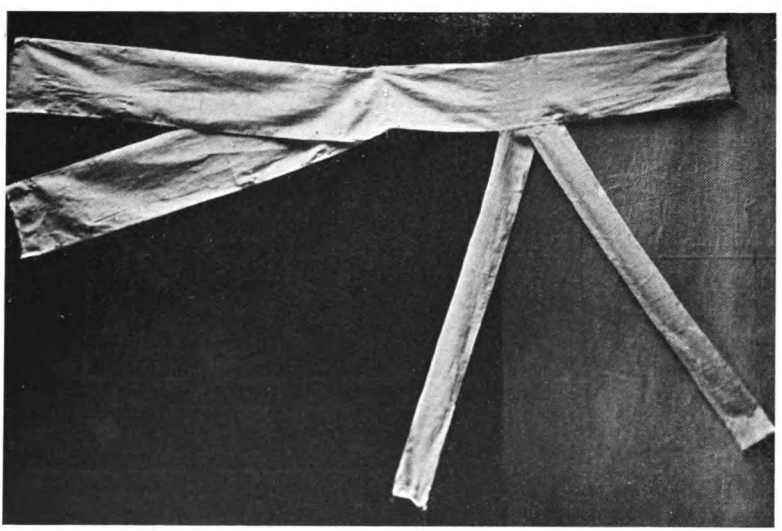

Fig. 99.—Boston Y-bandage.

THE BOSTON Y-BANDAGE. (Fig. 99.)

Uses.—To support or hold a dressing on the breasts.

Take a strip of muslin 8 inches wide and long enough to reach from the anterior axillary fold of one side, around the

back to the anterior axillary fold of the other side. To one end of this strip sew two strips of similar length and 4 inches wide to make a long **Y**. Sew a strip 2 inches wide and 20 inches long to either side of the center of the wide strip.

Place the body of the bandage around the back of the patient and carry the lower arm of the **Y** across the front of the chest, supporting the breast, but not covering the nipple, and fasten it with safety-pins to the end of the wide strip. Carry the upper arm of the **Y** across the front of the chest above the nipples, and fasten it to the broad strip. Bring the narrow strips over either shoulder and fasten them with safety-pins to both arms of the **Y**.

This bandage is not more efficient than the ordinary breast-binder, nor is it so easily applied. Its principal advantage lies in the ability to change dressings on the breasts without removing the bandage; and to allow a mother to suckle her baby without removing the support from the breasts.

PART III

HANDKERCHIEF BANDAGES

In emergencies nothing exceeds the usefulness of the so-called handkerchief bandage, because it can be made of almost any woven material and can be used in various forms and for numerous purposes. When possible to obtain it, a

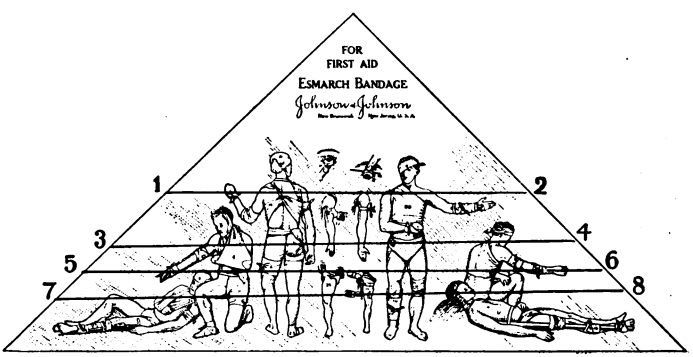

Fig. 100.—Showing the lines on which to fold the triangle to make a broad bandage or a cravat.

thin pliable material, such as cotton, linen, silk, gauze, cheesecloth, or a very thin muslin should be selected. A piece 1 yard square is folded into a right-angled triangle, or cut into two equal triangles; the square handkerchief is seldom used. The long side of the triangle is known as the base; the opposite angle (a right angle), as the apex, and the extremities of the base as the ends of the bandage.

The triangle may be made into a broad bandage by carrying the apex to the base and folding this quadrangle once.

A narrow bandage, the so-called cravat, may be made by carrying the apex to the base and folding the quadrangle two or three times (Fig. 100). When fastening the ends, safety-pins should be used if available, or they may be tied, a reef knot rather than a granny being used, as the former is more secure.

A very useful triangle, on which illustrations for its use are printed, is found in many first-aid kits, such as those carried by members of the militia of some states. A study of

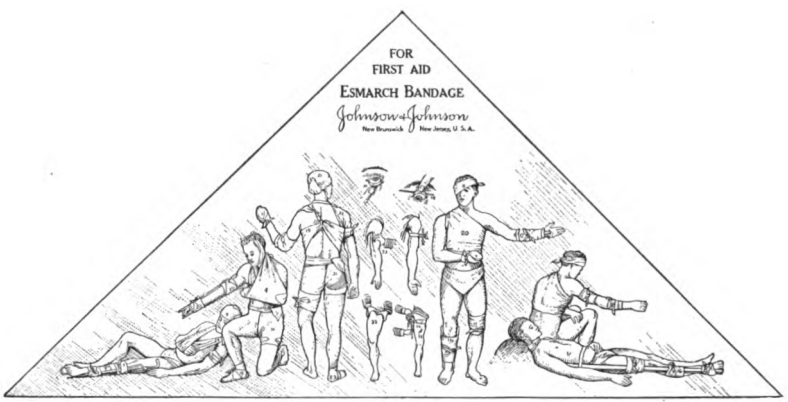

Fig. 101.—A first-aid handkerchief bandage.

this triangle with practice in applying it is compulsory in some military organizations (Fig. 101).

Many applications of the handkerchief bandage are named according to the use of a triangle or a cravat, and also according to the regions covered, that on which the base rests being named first and the location of the knot later. The knot should not rest on a prominent bony part, nor should it be so placed that the patient will lie on it when in the recumbent position.

SPECIAL HANDKERCHIEF BANDAGES.

The Occipitofrontal Triangle (Fig. 102).—*Uses.*—To hold a dressing on the scalp.

Place the base of the triangle below the occiput, carry the apex forward over the top of the head and allow it to hang down over the face. Bring the ends around either side of the head, above the ears or covering them as desired, and tie the ends over the forehead. Pull on the apex to make the

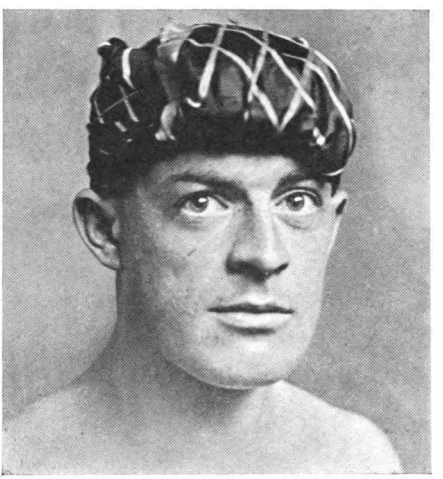

Fig. 102.—Occipitofrontal triangle.

bandage lie snugly and then turn the apex over the ends and fasten it with a safety-pin.

The scalp may be covered with a fronto-occipital or a bi-temporal triangle.

Verticomental Triangle (Fig. 103).—*Uses.*—To hold a dressing on the head or back of the neck.

Place the base of the triangle on the top of the head and either cheek, carrying the apex to the back of the neck. Knot

the ends under the chin. Make the bandage snug over the head, and carry the apex to one side and secure it with a safety-pin.

The auriculo-occipital triangle, the triangle of the head (Hunter's cap), and the square cap of the head are often described as handkerchief bandages of the head, but they are

Fig. 103.—Verticomental triangle.

no more efficient than those described above and are more difficult to apply.

Posterior Triangle of the Shoulders (Fig. 104).—*Uses.*—To hold a dressing on the scapular region.

Place the center of the base of the triangle on the back of the neck, allowing the apex to drop downward. Carry the ends of the bandage over either shoulder, under either axilla, and tie them over the redundant portion of the triangle. Make enough traction on the apex to make the triangle lie

snug, turn the apex upward over the ends, and secure it with a safety-pin.

This triangle is a variation of the "breakfast shawl" (Fig. 105), or the cervicodorso-sternal triangle of Mayor, in which a cravat is placed around the body close to the armpits and the ends are carried over the shoulders and fastened to it in

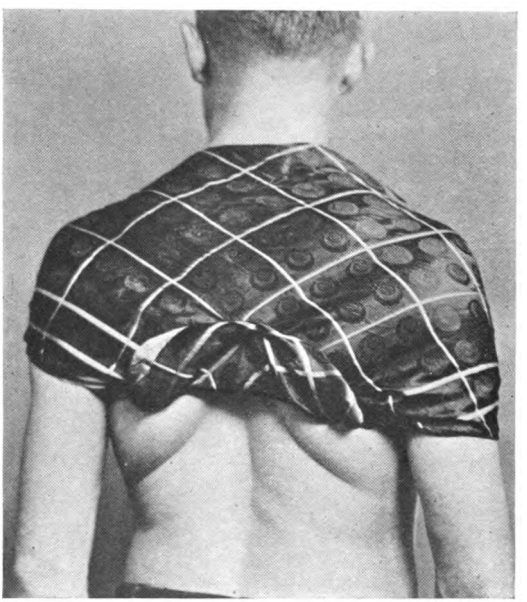

Fig. 104.—Posterior triangle of the shoulders.

front, while the apex is passed under it and fastened in the back.

Thoracicoscapular Triangle (Fig. 106).—*Uses.*—To hold a dressing on the front of the chest.

Place the base of the triangle on the chest, with the apex extending over the shoulder. Carry the ends under the arms and tie them over the apex. Make enough traction on the

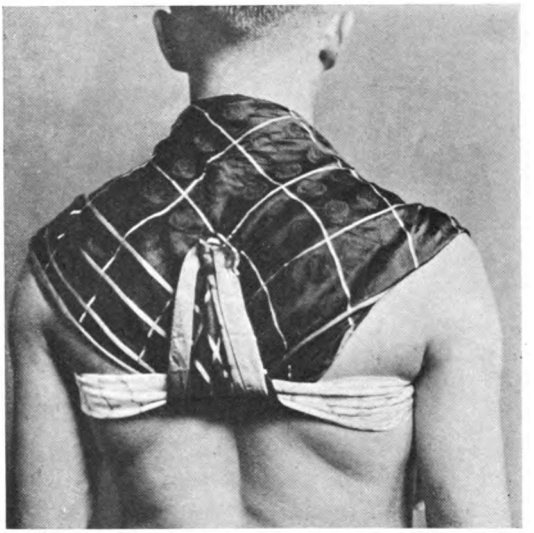

Fig. 105.—"Breakfast shawl."

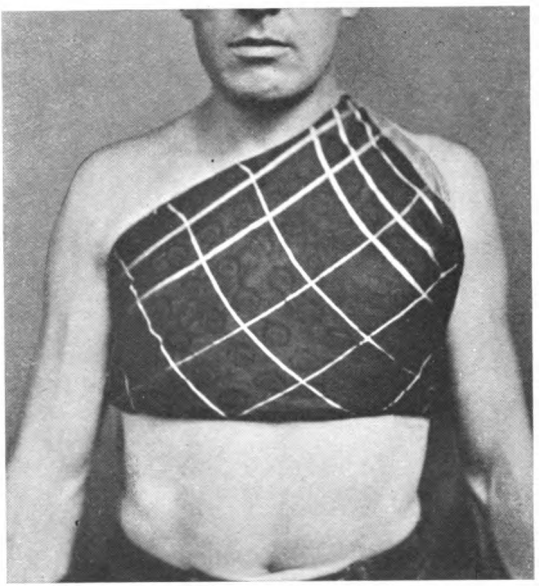

Fig. 106.—Thoracicoscapular triangle.

apex to make the bandage lie snug, turn it over the ends, and secure it with a safety-pin. Any fulness of either margin of the triangle may be overcome by tucking and pinning.

Suspensory Triangle of the Breast (Fig. 107).—*Uses.*—To support or hold a dressing on the breast.

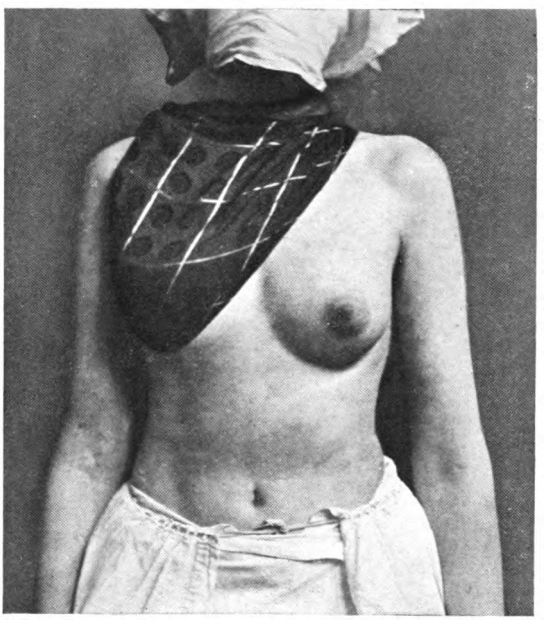

Fig. 107.—Suspensory triangle of the breast.

Place the center of the base of the triangle under the inner portion of the breast, with the apex extending over the shoulder of the affected side. Carry one end under the axilla of the affected side and the other over the shoulder of the sound side. Tie the ends over the apex. Make enough traction on the apex to properly support the breast, turn it upward over the ends, and secure it with a safety-pin.

Brachiocervical Triangle (Fig. 108).—*Uses.*—As a sling for the forearm.

With the forearm flexed at a right angle, place the center of the base of the triangle under the wrist, with the apex extending toward the elbow, and carry the ends around the neck and tie. A more presentable bandage or sling will be made if the anterior end is carried to the side of the neck on

Fig. 108.—Brachiocervical triangle.

the sound side, while the posterior end is carried around the neck on the affected side. Make enough traction on the apex to make the bandage lie flat and smooth, fold the excess portion of the apex, and either tuck it under the arm or bring it forward and secure it with a safety-pin.

Triangle of the Hand (Fig. 109).—*Uses.*—To hold a loose dressing on the hand or to cover a bandage of the hand.

Place the center of the base of the triangle on the palmar surface of the wrist. Carry the apex along the palmar surface of the hand, over the tips of the fingers, and along the dorsal surface of the hand to the wrist. Carry the fulness of

Fig. 109.—Triangle of the hand.

the triangle from either side over the back of the hand and tie the ends around the wrist.

Sacropubic Triangle (Fig. 110).—*Uses.*—To retain a dressing on the sacral region or both buttocks.

Place the center of the base of the triangle over the sacrum, carry the ends around the body, and fasten them over the abdomen. Carry the apex downward, through the crotch, upward over the pubes, and fasten it to the ends with a safety-pin.

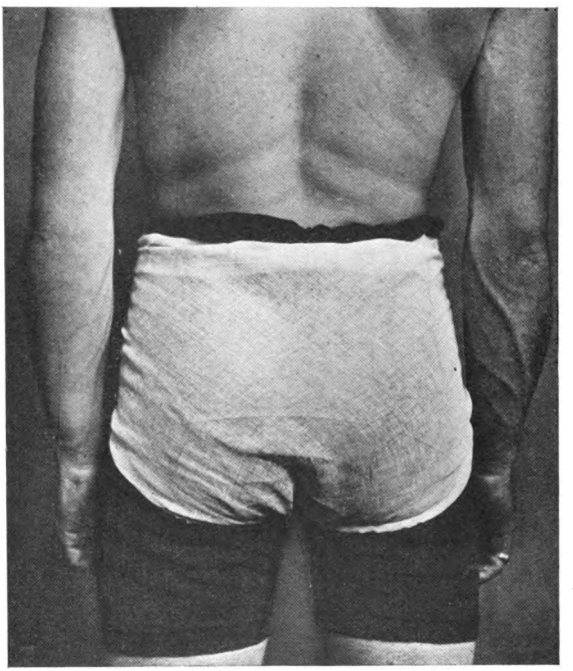

Fig. 110.—Sacropubic triangle.

Iliofemoral Triangle (Fig. 111).—*Uses.*—To retain a dressing on the buttock or hip.

Tie a cravat around the waist. Place the base of the triangle around the thigh of the affected side, near the gluteal fold, and tie the ends. Carry the apex upward over the buttock and under the cravat. Make enough traction to make

the bandage lie snug, turn the apex downward over the cravat, and secure with a safety-pin.

Triangular Knee-cap (Fig. 112).—*Uses.*—To retain a dressing to the knee.

Place the center of the base of the triangle below the patella, with the apex extending upward over the knee.

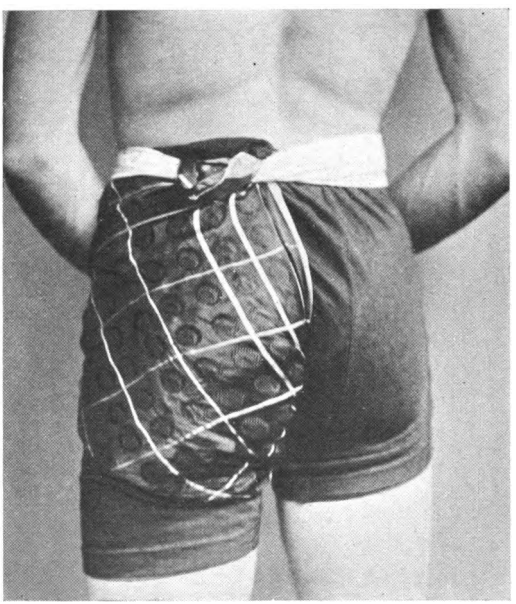

Fig. 111.—Iliofemoral triangle.

Carry the ends around the knee, under the popliteal space, and tie them over the apex, above the patella. Make enough traction on the apex to make the bandage lie snug, carry it downward over the ends, and secure with a safety-pin.

Triangle of the Foot (Fig. 113).—*Uses.*—To retain a dressing on the foot, or to protect a bandage of the foot.

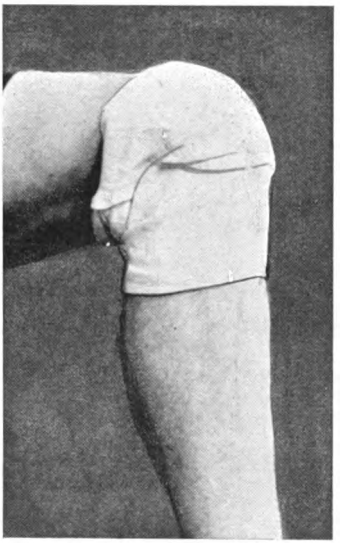

Fig. 112.—Triangular knee-cap.

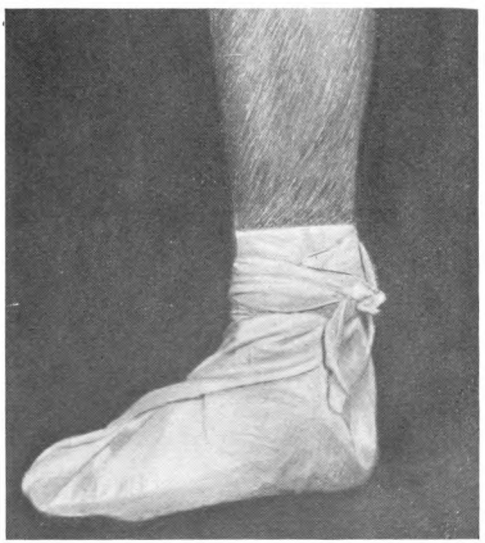

Fig. 113.—Triangle of the foot.

Place the center of the base of the triangle on the back of the leg, just above the heel, and carry the apex forward along the sole, over the tips of the toes and along the dorsal surface of the foot to the ankle. Carry the fulness of the triangle from either side over the back of the foot and tie the ends of the bandage around the ankle.

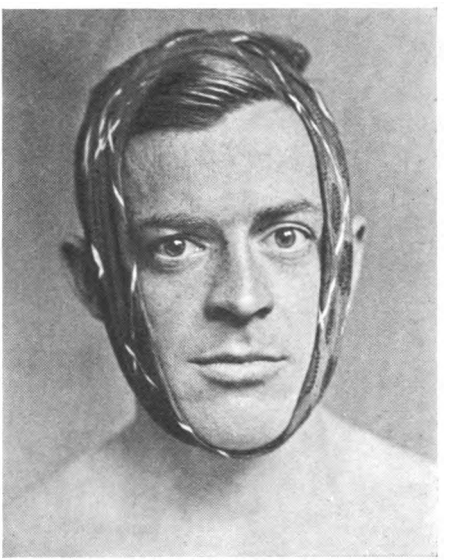

Fig. 114.—Mentovertico-occipital cravat.

Many of the cravats described and advocated are of value in emergencies; they are seldom used in other instances. Their application is so simple that a full description of the numerous ways in which they may be employed is deemed unnecessary. An outline of the application of a few of them will suffice to show the general principles underlying their use, and the ingenuity of the operator can make them applicable to any portion of the body.

Mentovertico-occipital Cravat (Fig. 114).—*Uses.*—To retain a dressing under the chin or to immobilize the lower jaw.

Place the center of the cravat beneath the chin, carry the ends upward over the cheeks, cross them on top of the head, carry them downward and backward around the occiput, and either tie them in that position or carry them forward on either side of the body of the lower jaw and fasten them on either side of the chin.

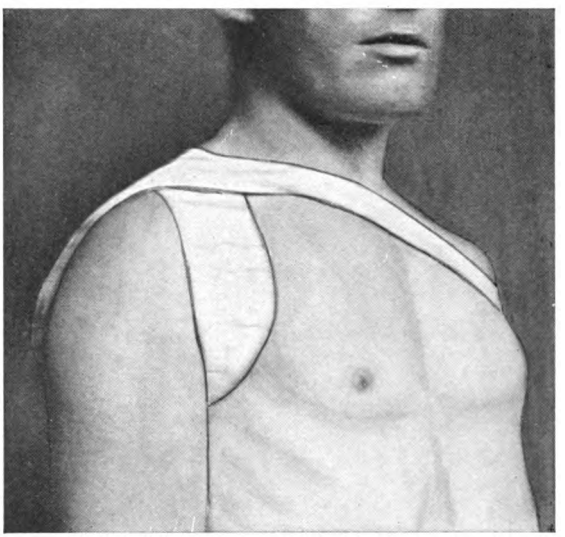

Fig. 115.—Bisaxillary cravat.

The Bisaxillary Cravat (Fig. 115).—*Uses.*—To retain a dressing under the axilla or on top of the shoulder.

Place the center of the cravat in the axilla, carry the ends around the anterior and posterior aspects of the shoulder, cross them on top of the shoulder, and carry them beneath the axilla of the sound side, where they are tied.

The Brachiocervical Cravat (Fig. 116).—*Uses.*—As a sling

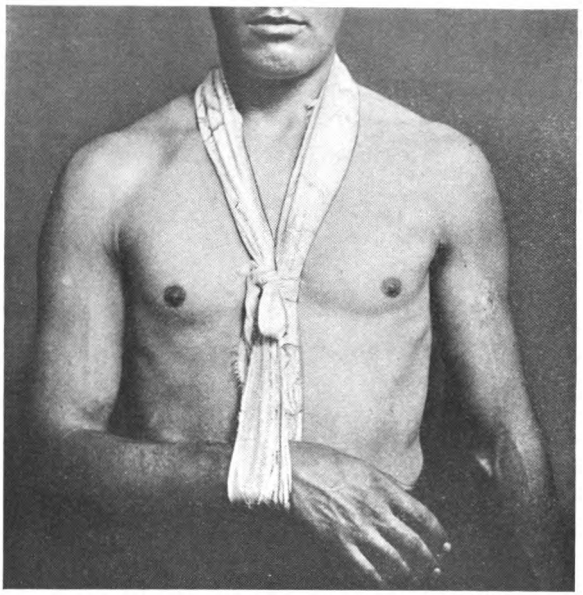

Fig. 116.—Brachiocervical cravat.

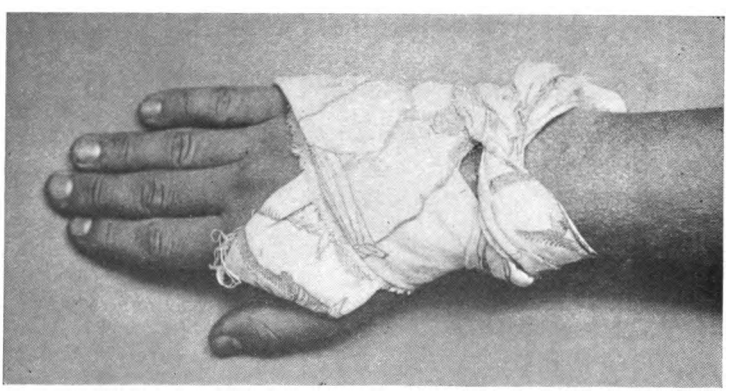

Fig. 117.—Cravat for the hand.

for the forearm; especially useful when the weight of the forearm is utilized to make traction on the arm.

With the forearm flexed on the arm, pass the cravat around the wrist and neck in such a manner that the ends will come together over the front of the chest. Either tie them in that position, or cross them and then tie them around the body of the cravat.

Cravat for the Hand (Fig. 117).— *Uses.*—To hold a dressing on the hand.

Place the center of the cravat on the palm of the hand between the thumb and index-finger, bring the ends over the back of the hand, cross them, and tie around the wrist.

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